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ABSTRACT

A model is proposed for a rural industrial education outreach center which would function on a regional basis providing supportive services to several Alaskan school districts in the areas of needs assessment; identification, purchase, and distribution of instructional materials; design of competency-based programs; teacher orientation and inservice training; and evaluation. Introductory sections document the need for such an articulation system with reference to state education policies and demography. Beginnings of the model are traced to two pilot projects: one on regional sharing of commercially prepared vocational education software between rural school districts in Oregon (the Ken Cook instructional system in Coos County) and the other Alaskan Rural Industrial Education Project involving six school districts in the development of competency based and individualized programs. Presentation of the model itself, based on Havelock's research, emphasizes a systems approach establishing the center in three phases: three districts, regional, and statewide. Objectives are listed under goals of improved industrial education occupational competencies, delivery of overall vocational education services through a support system, and improved interpersonal relationships among all components. A management plan shows sample rotation patterns for materials. Program evaluation procedures, resource requirements, and suggested budget are included. Appendixes contain Alaska employment projections and training needs, information on the Ken Cook system, and pilot program evaluation instruments. (JT)

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A RURAL INDUSTRIAL EDUCATION OUTREACH CENTER: A Systems Approach

Prepared for the

Alaska State Department of Education

By

The Northern Institute

for

Research, Training and Development, Inc.
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Rural Industrial Education
Outreach Center:
A Systems Approach

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GLOSSARY OF TERMS

Automated Teaching Systems means those instructional packages which are self-contained in a programmed learning format and based upon conpetency instruction. The instructional packages include all the necessary equipment, instructional plans, and evaluation systems. The materials are automated in a step-by-step method of instruction which reinforce student learning.

Competency Based Instruction means an approach to instruction in which the student is required to demonstrate skills and specific tasks in an actual learning situation. Actual performance ensures that the student not only has acquired the knowledge but also the ability to perform the competencies that are essential to successful occupational career choices.

Industrial Education Programs means those education programs:

(a) Which pertain to the body of related subject matter, or related courses, organized for the development of understanding about all aspects of industry and technology, including learning experiences involving activities such as experimenting, designing, constructing, evaluating, and using tools, machines, materials, and processes; and

(b) Which assist individuals in making informed and meaningful occupational choices or which prepare them for entry into advanced trade and industrial or technical education.

Outreach means the process by which representatives of agencies, institutions, organizations and individuals have been provided the opportunity to participate on a continual basis in the development of services and programs, especially with regard to the expansion of the delivery of industrial education services through those agencies, institutions, organizations and individuals.

Systems means the sum total of parts working independently and working together to achieve required results of ourcomes, based upon needs.

System Approach means a process by which needs are identified, problems are selected from alternatives, methods and means are obtained and implemented, results are evaluated, and required

revisions to all or part of the system are made so that the needs are eliminated.

Vocational Education means organized educational programs which are directly related to the preparation of individuals for paid or unpaid employment, or for additional preparation for a career requiring other than a baccalaureate or advanced degree; for purposes of this paragraph, the term "organized education program" means only:

(a) instruction directly related to the occupation or occupations for which the students are in training or instruction necessary for students to benefit from such training; and
(b) the acquisition, maintenance, and repair of instructional supplies, teaching aids and equipment.

Vocational Instruction means instruction which is designed upon its completion to prepare individuals for employment in a specific occupation or cluster of closely related occupations in an occupational field, and which is especially and particularly suited to the needs of those engaged in or preparing to engage in such occupation or occupations. Such instruction may include:

(a) Classroom instruction;
(b) Classroom related field, shop, and laboratory work;
(c) Programs providing occupational work experiences, including cooperative education and related instructional aspects of apprenticeship programs;
(d) Remedial programs which are designed to enable individuals to profit from instruction related to the occupation or occupations for which they are being trained by correcting whatever educational deficiencies or handicaps prevent them from benefitting from such instruction; and
(e) Activities of vocational student organizations which are an integral part of the vocational instruction.

1.0 THE NEED

On February 7-8, 1977 educators from around the state met to identify problems facing education in Alaska. The workshop was planned and conducted by the Alaska Center for Staff Development under a grant from the Alaska State Department of Education. Participants represented a relatively broad spectrum of individuals directly or indirectly concerned with education in Alaska. Participants were asked to identify what they perceived to be the major problems facing education in Alaska both now and within the next five (5) years.

Among the fifty-two (52) statements generated by the group, seven major themes reflecting current conditions and trends influencing education emerged. These included:

I. Conditions Bearing Directly on Education

A. Education will continue to meet opposing demands from the public -- to provide a diverse range of services on the one hand and to "return to the basics" on the other.

B. Educational policies and procedures will continue to be strongly influenced by organized labor in both professional and non-professional areas. In particular, the movement to unionize teachers will increase in tempo with an associated increase in militancy and demands.

C. Teacher certification will continue to have a strong influence on programs as will the supply and distribution of professional personnel. While there will be an oversupply of qualified persons in some urban areas, there will be shortages in the rural areas. For this reason, among others, new teacher education programs are needed (both pre-service and in-service) to meet rural program needs.

D. Federal intervention in Alaskan education will continue, particularly with regard to equal opportunity. The use of federal funds will be increasingly subject to constraint, but there will be no significant increase in the total amount of federal funds. The forthcoming increased emphasis on pre-school and manpower training programs at the national level will also affect Alaskan education. Although the involvement of the Bureau of Indian Affairs in education for Alaskan Natives will continue to decrease, the influence of Native corporations on rural development will affect education policy and programs in the future.

E. A continued emphasis will be placed on decentralizing the delivery of rural secondary education. Programs begun under a centralized administration may be discontinued or changed significantly under the new local administration, contributing to problems associated with the loss of continuity in educational programs.

F. On the whole, educational costs will continue to escalate and to take an increasingly larger portion of the tax dollar. Some of Alaska's increased costs are due, in part, to the proportionately higher costs of rural education. However, rural villages appear to be receiving increased federal and state services and aid for education. These conditions may contribute to a reexamination of the basis for distributing state funds for education.

G. As an outcome of the "Hootch Case", and increasing emphasis on equal opportunity and human rights, there will be increased demands on education for new programs and program development funds. All this may intensify the important current problem of requiring programs, although no resources exist to develop and implement the programs. With

increasing emphasis on 1) fiscal and program accountability by the Alaska Legislature, 2) projected demands for new programs and increased costs, and 3) the tendency for Alaskan educators to take a defensive posture, the problem of providing leadership for education will persist.

H. Pertinent research in education for Alaska is lacking in many areas. In many cases, where such research does exist, it is not being adequately disseminated in a form useful to practitioners. While research is one form of support, there are many others. There is an apparent lack of any kind of mandate for support agencies within education. Some feel that the proliferation of support agencies consumes financial resources which might otherwise be available for school districts. The matter of determining forms and amounts of support and arrangements for delivery will continue to be a problem over the next five years.

II. Governance - Alaska will continue to have problems with self-determination due to strong national influence. This influence can be felt through demands for ecological responsibility, natural resource development, and political intervention through a proliferation of new laws, court decisions, and agencies. Alaskans will be increasingly resentful of and resistant to bureaucracy at all levels of government; however, as minority groups become more able to deal with the system, the anti-establishment sentiment will tend to dissipate. The movement of the state capitol could influence the role of the state in the goverance of education, but Anchorage's political dominance will increase. The consumers of education appear to be demanding more involvement in the planning process and administration of education. The interactions

of the various governance trends and Alaskan attitudes of self-determination appear to be multiplying the problems in education governance and leadership.

III. Economic Characteristics - Alaska currently has one of the highest per capita incomes of any geo-political entity in the world and it appears that this trend will continue in the forseeable future. Accompanying this increase in income is a parallel increase in the cost of living, with a trend to a proportionately higher increase in rural villages. This income and cost of living increase may be retarded due to the "slow down" effect on statewide economic development brought about through the national ecology movements and their influence. In the past, the state has followed a practice of spending in advance of anticipated revenue. This may be averted, at least in part, by the newly established Permanent Fund. The availability of financial resources to support public education will be subject to the economic trends and direct competition for priority use created through increased awareness of human rights and the increased demands for educational services.

IV. Population of Alaska - It appears that the population will continue to increase in the state, but at a more stable and even rate than in the past. This growth will be due in large part to the development of natural resources which will influence the types of people who contribute to the growth, to the stability of the population, and to the geographical location of this growth. Alaska's population will continue to distribute itself in an uneven fashion with urban areas continuing to grow while most rural areas remain stable or even decline

from the already sparse numbers. This uneven growth will contribute to the problem of extreme school sizes, too large in urban areas and too small in rural areas. Future projections would indicate Anchorage will continue as the dominant population center and the area facing the most severe problems with schools that are too large.

V. Communication and Transportation - Improved communication systems (e.g., ETV, improved phone systems) and increased availability of transportation bring increaseing numbers of Alaskans into contact with world wide socio-economic happenings. This availability of current information to rural Alaska will significantly increase the demands related to opportunities and expectations for education.

VI. Social-Psychological Characteristics - Alaska will continue to lead the nation in the proportionate number of suicides, particularly of young adults, alcoholism cases of all ages, and divorces. This may be attributed to the effort of rapid technological changes and increasing impact of national events upon the developing citizenry of the population. These problems continue to impact on students of all ages and continue to promote questions concerning the responsibility for preventative education by the schools.

VII. Supply and Development of Natural Resources - Education in Alaska will continue to be influenced by the development of natural nonrenewable resources, upon which the state economy may very possibly continue to rely. The development will be most apparent in the outer continental shelf petroleum deposits, toward critical minerals required by the American economy. The impact of such development on education will be felt through effects upon the social structures, manpower needs,

and available financial resources. These effects will be regulated by a nationwide demand for increasingly scarce natural resources which are relatively untapped in Alaska. A force countering these demands will be the continued national ecology influence which will have a "slowing" effect upon the State's economic development.

Among the specific student problems which were rated consistently high by participants were the following:

-- Most high school graduates from Alaska lack survival skills (ability to survive as an independent person who can handle money, budget, complete income tax, acquire insurance, etc.)

-- School and community personnel do not know competencies needed by rural high school students for survival in the society they will enter.

-- Political expedience now dictates that program development must begin before adequate time can be given to identification of needed student outcomes.

-- A student's education and level of attainment is highly influenced by experiences outside the formal school setting, which vary significantly from community to community.

-- Many elementary school graduates are not adequately prepared to read secondary level material.

-- Students are into alcohol, drugs, other escapism.

-- Students show evidence of lack of respect for self, others, property, and laws.

-- Elementary, secondary and high education students are not adequately prepared for problem solving.

-- Many young people are unable to cope with the changing environment or with a change in their environment.

-- Students in small rural vocational programs do not emerge with minimum job entry skills.

Other related problems raised by participants which have direct re-

lationship to the industrial education outreach system proposed herein include the following:

-- Teacher education programs are not preparing teachers for rural teaching.

-- Rural education positions present problems and living conditions which are sufficiently unattractive to discourage people from making a long-term commitment.

-- Because of the limited numbers of teachers in rural education programs, it is difficult to achieve depth of subject matter.

With respect to teacher preparation and professional development a high emphasis was placed upon rural education and vocational education. The importance of increased services to rural areas in a decentralized manner was also noted.

Evidence from other studies and reports support many of the above statements. Griffiths' et al. (1976, p. 19) study of the Alaskan Native school dropout over a five-year period indicated an increase in the number of students who planned to undertake vocational training--from 10.5 (1971) to 27.1 percent (1976). Students also indicated a desire to have a steady job with security, to have pride in doing a good job, to help other people and to develop specific skills.

Among the specific recommendations coming out of the report were the following:

-- extend vocational education curriculum choices for students in order to maximize opportunities for preparation for careers at all levels--technical, manual, etc.

-- link services to the dropout students before they leave the school system.

-- create a means to facilitate intra- and inter-agency cooperation through some coordinating and facilitative role in relation to the Native dropout population.

-- recognize the significant increase in the number of students who prefer to remain in Alaska and attend a public school.

-- give serious consideration to programs for career development and counseling related to vocational information.

With respect to vocational teacher education training, Spaziani (1974, p. 32) has further noted the importance of actual field-based settings in order to provide relevant opportunities for competencies to be developed. Among the problems noted in the report include: 1) the increasing rate of technical obsolescence due to accelerated change in all fields, 2) loss of time and expense involved in travel, 3) lack of relevance in non-field oriented education and training programs, and 4) the need to include non-professional/non-technical classroom personnel in teacher education training. Among the core curriculum emphasized by Spaziani included: 1) providing competencies in the areas of greatest need in the field, 2) designing more comprehensive offering of off-campus classes, 3) providing curriculum which is of the greatest value to students, 4) providing flexibility to meet the individual needs of students and 5) providing greater flexibility in student program planning and facility utilization.

In a related report on needs assessment for vocational education teachers in secondary school, Spaziani (1973, p. 1-5) indicated several other issues facing vocational education. Because of historic fluctuations in local conditions, projections in Alaska are difficult to construct with respect to long-range planning for the preparation of vocational teachers. As a result corresponding enrollment projections in Alaska's vocational programs both at the student and teacher levels

are very difficult to predict. Therefore, many uncertainties exist throughout Alaska's local school districts.

Nevertheless at the state level projections with respect to occupational growth are indicating a rather large increase in the number of vocational occupations (see Appendices A-4 through A-7). In addition, the State's enrollment in vocational programs outlines an increase from FY 1978-1982. The Trades and Industry occupational program is projected to increase by 8,000 enrollments and continue to rank second only to office occupational programs (see Appendix A-6). The Alaska Five-Year Plan For Vocational Education (FY '78-82) has noted a training deficit of over 2,500 people needed in trades and industry to meet employment projections in 1978 alone.

Further evidence of various program needs in vocational education are clearly stated in the Five Year State Plan. Under Section B - "Where We Are" the plan noted concern in a variety of areas:

-- Leadership Development
In Alaska, insufficient numbers of LEA personnel have the necessary training and experience in assessing local needs and organizing and developing vocational education programs to meet those needs.

-- Personnel Development
There is a continuing need for a systematic approach to rural and urban teacher certification and program accreditation standards, to the training of new vocational education teachers, to the training and re-training of those persons already working in the field of vocational education, to applied research as it relates to vocational education, and to readily accessible assistance with vocational education program development, implementation, and evaluation.

-- Emerging Occupations
Occupational preparation tends to lag behind social and economic developments and the related occupational demands.

-- Guidance and Counseling
Many individuals receive little or no help in making appropriate

career and education decisions that facilitate their moving between schooling and employment.

-- Cooperative Vocational Programs
Utilization of both school and community resources is required to provide students with a comprehensive, integrated program of learning and applying knowledges and skills.

-- Rural School Vocational Programs
Students in rural schools need viable programs for career decision making and vocational skill building that accommodate the lack of facilities and staff which prohibit the development of a full vocational program.

-- Short Preparation Programs
Some students, whose schools do not have vocational education programs in their chosen occupational fields that give them entry level skills, need brief, intensive on-the-job or institutional programs.

-- Regional Vocational Technical Programs
It is not cost/effective to provide sophisticated vocational-technical instruction facilities and equipment in all communities; rather, there need to be centers accessible to as large a portion of the client population as possible.

-- Delivery Strategies
Alaska's diversity requires a wide array of means of meeting vocational education needs.

-- Exemplary Programs
There is a need for identifying, developing and giving visibility to exemplary programs that use alternative means of delivering vocational education.

The Five Year Plan also suggests directions to be pursued under Section C - "Where We Want To Be". These directions include:

-- Rural School Vocational Programs
Vocational programs will be developed in small schools that are consistent with the needs of the community and that provide the option of traditional vocational education by providing industrial arts skills and articulation with other school districts, the Alaska Skill Center, private schools or the University system.

-- Short Preparation Programs
Alternative delivery systems for brief, intensive skill building programs will be identified and/or developed for occupational education.

-- Delivery Strategies
Alternative strategies for delivering vocational education will be identified and/or developed and tested systematically for feasibility, cost-effectiveness and student impact.

-- Exemplary Programs
Exemplary programs will be identified, developed and disseminated for consideration replication and adaption.

The Plan further indicates that Alaska has some extremely small, remote, and isolated communities with little access to vocational education. As a result, "the identification, development, and dissemination for replication and adoption of innovative exemplary programs must be provided."

The State's priorities for program improvement thus include an emphasis to:

Identify, develop and/or test alternative strategies for delivering Vocational Education.

Identify, develop and disseminate exemplary programs for replication and adaption.

In order to meet both the individual's needs and that of the State's manpower needs, the specific State objectives and activities related to vocational education in rural areas now include the following:

Objectives	Activities
Explore, experiment with and refine various instructional delivery system models so that schools may choose the most efficient and effective methods of offering vocational education programs to their students. (PI 3.1)	Evaluate, analyze costs and develop a replication strategy for delivery system alternatives already in use in Alaska such as the Rural Industrial Education model, the Education Satellite System, the CRT (Community Resource Trainee) Program, the Rural Student Vocational Program (R.S.V.P.), Project Typing Outreach, Military Vocational Education Programs available for replication, Television and video tapes, and ATIPP (Alaska Talent, Information and Promising Practices). (PI 3.11)
Through the vocational Plans of Service, and the Rural School Program and curriculum development process,	Continue the development and implementation of the Industrial Education model, select at least one area per year for model develop-

Objectives (cont'd.)	Activities (cont'd.)
develop or continue vocational education programs consistent with the needs and capabilities of small schools. (A 21.1 BG 16.1)	ment. (BG 16.1.1) Develop procedures for LEAs for step by step documentation of need, articulation capability of delivery and competency levels achieved by students as a result of completing programs. (A 21.1.2)

(see Appendices A-1 for various other related five year objectives of this proposed project.)

The end result of all of the above effort was the State Department of Education's development of an RFP (Request For Proposal) to re-establish a rural industrial education outreach center. The Northern Institute for Research, Training and Development received a grant award to develop the concept further and submit a proposed outreach model for Department of Education review and consideration. The remaining sections of this proposal will be directed toward that end.

2.0 SIGNIFICANT BEGINNINGS

Coos County Regional Sharing Concepts -- Oregon

A pilot project on regional sharing of commercially prepared vocational education software between school districts in rural areas was undertaken in Oregon. In 1974 the Ken Cook instructional system was located by the Coos County Intermediate Education District's career education coordinator and suggested to the superintendent. A review of the system was undertaken by representatives of Coos County's six school district superintendents, school board members and the county intermediate education district board. A pilot approval was reached for procurement of materials on a trial basis with purchase made jointly by the intermediate education district and one participating school district. Results of the pilot system resulted in the recommendations for procurement of the system for all six county school districts with additional funding made available through NDEA, Vocational Education Exemplary and Title III.

A report entitled Regional Sharing Concepts For Small Engine Technology in Coos County, Oregon 1974-1975 (Hillway, pp. 1-3) indicated the following project objectives:

> "The primary objective of this one year project will be to demonstrate and identify techniques for sharing commercially prepared software between cluster programs in Coos County.
>
> Goal No. 1 To establish and demonstrate a model for sharing individualized instruction sortware between six districts in Coos County.
>
> Objective A Identify and purchase materials of common interest to cluster teachers.

Objective B Establish a county wide schedule for rotation of materials.

Objective C Work with districts on internal scheduling of materials.

Goal No. 2 To make individualized instruction a primary mode of instruction in all cluster programs in Coos County.

Objective A Orient all cluster teachers in the county to individualized instruction concepts and procedures.

Objective B Each cluster instructor will utilize individualized instruction material for a minimum of three weeks in covering subject matter normally covered in a traditional mode.

Objective C At the end of the year, each cluster instructor will desire to increase the amount of individualized instruction in his/her cluster.

The evaluative report also rated both the problems and successes associated with the project. Most noticeable the problems included: over-scheduling, inadequate student/teacher ratio of instruction, time factors, storage and facility space problems, inexperience on the part of teachers/students with materials, and distractions associated with use of some of tha material.

The strengths of the project included: 1) a high degree of student participation; 2) a favorable reaction to the use of this method of instruction compared to the conventional classroom techniques; 3) good regional sharing concepts and 4) rather high evaluations by the students of the Ken Cook Automated Teaching Systems (see Appendices A-8). Assessments of the program depended upon: a) student grade level, b) instructor expectation, c) classroom discipline, d) the instructor's base of experience, e) the number of modules taught and f) whether the modules were the only subject taught in the classroom during a given class

period. Consider the following statement drawn from the report (Hillway, p. 14):

"Teachers, generally, expected less from junior high school students, but received (in most cases) more motivation and attention to the course. Where teachers expected performance, and demanded it, they were happy with the system. When it was not demanded, results were usually not as good as expected. When the teacher's aim was just to run the students through the course, no other results were expected and the instructor was satisfied. Where discipline was lax and attention to details was not stressed, results were poorer. Instructors with no small engine experience, who had not previewed the programs, had difficulty helping students. Instructors who taught only one SET (Small Engine Training) course (e.g., 2 Cycle) were more critical of the scope of instruction provided than those who had taught four or five different courses. Others, who had to teach subjects other than SET during the same class period, had difficulty getting around to everybody. (Although the self-instructional system does remove much of the burden from the teacher, there is a continuing involvement with students who listen poorly, or who anticipate the program instructions. Normally, the time gained for the teacher gives him the opportunity to assist the poorer students--something he usually finds difficult to do under other conditions.)"

Student attitude changes worth noting included the following:

1. Students with poor reading skills had few problems with the audio/visual approach. Most indicated a liking for the system.

2. Students, normally slow achievers, were turned on by the hands-on approach and self-pacing system with which they were better able to compete. Success syndromes improved self images.

3. Some reading-oriented students had difficulty doing the actual manual work, while having no difficulty with the concepts and theories presented.

4. Most students found the SET system simply a very easy way to learn--and liked it.

5. In many instances, attendance of individual students improved while they were taking the SET classes. (In the District 9 Continuation School, this was not true.)

6. In some instances, success with the SET assignments resulted in improved attitudes toward other classroom participation. Some offered to do extra work by aiding the instructor or helping others.

Both teacher and student evaluation reports of the project are indicated in the Appendices (A-8 and A-9).

In addition several basic sharing concepts were recommended as a result of this pilot effort. They included (Hillway, p. 18):

1. Sharing according to the extent of need of individual schools. Program concentrations were greatest in the larger schools, where needs were greater as determined by the number of students.

2. Sharing to provide accessibility for as many students as possible. All programs were available to all schools which desired to use them. All programs were rotated each nine weeks. Each school had the use of at least two different programs each nine weeks.

3. Only software would rotate. Workstations, tools and engines, once assigned to a school district, would remain within the schools of that district, and become the responsibility of that district.

4. The IED would provide cooperative purchasing and warehousing of student materials, physical rotation of program software, as well as repair service for audio/visual equipment.

The Alaskan Rural Industrial Education Project: A Pilot Program

A rural industrial education project similar to the Coos County model was undertaken in 1976 in Alaska from which much can be learned. The general goals of that project included the following:

1. To design and implement a model program in Industrial Education which will be field tested at six different rural secondary schools.

2. To provide inservice training for teachers involved in the project.

3. To make all programs competency based and individualized in nature.

4. To conduct a local community needs assessment to determine

curriculum direction which will provide future recommendations regarding the program.

5. To provide an evaluative process to assess the pilot project at its termination.

6. As a result of the project, participating schools should generate sufficient student enrollment to qualify for vocational education support funding which will assist each district in reaching financial independence regarding industrial education programs.

7. To utilize the programs for adult and community as well as the secondary students.

Three sets of facts supported in the establishment of this pilot project. Research on a national level and in Alaska indicated generally that small rural schools were not able to provide the curriculum, instruction and counseling of quality and quantity compared to larger urban schools.

A second set of facts stem from the transition of S.O.S. (State Operated School) structure and administration to that of R.E.A.A. Some immediate concerns included:

1. The increased per-pupil cost of operating the small necessarily existent schools with special curriculum offerings.

2. Rural areas had not been able to compete with cities in attracting the highly specialized professional personnel.

3. Rural areas often could not meet population density requirements established by federal agencies, thus the rural areas were many times not eligible to receive certain funds.

4. With the autonomy established within the individual districts, it was necessary that a relevant and realistic curriculum be provided for students no matter how large or small the specific school may be.

A third factor came from an Alaska State Department of Education, Vocational Education: Trades and Industry (T.& I.) task force meeting held under the direction of program chief Mr. Ray Minge. The question that

surfaced asked "How could a quality Industrial Education program be developed and implemented for the newly formed R.E.A.A.?" Without question it was felt that the State Department of Education would need to offer leadership, and assume initial responsibility to implement a model program.

As a result, the Alaskan Rural Industrial Education Project, a pilot program, was established. It included the following guidelines:

1. The State Department of Education would initially assist in developing and coordinating a pilot program in Industrial Education.

2. The State Department of Education, Division of Vocational Education would assume the major cost of the pilot project for the first year.

3. In most cases the specialized courses would have to be taught by existing teachers who may or may not have any expertise in Industrial Education. This would require a minimum of training for existing teachers.

4. To maintain minimum cost of the program and yet provide the highest quality of instruction it would be desirable to share learning modules by establishing a schedule of rotation of equipment and programs. This sharing would take place between participating schools in the pilot project.

5. All instruction should be competency based and individualized; consistent with the format used in the developed Alaska State curriculum guide for Vocational Education T. & I.

Project responsibilities were shared three ways:

1. The Alaska State Department of Education, Division of Vocational Education T. & I. (Trades and Industry) financed the majority of the project costs. The equipment at the termination of the project June 30, 1977, was returned to the Center for Staff Development or negotiated for possible purchase.

2. The Alaska Center for Staff Development through the project grant administered and coordinated the project and had primary responsibility for its operation.

3. The participating schools were responsible for the following:

a. Participate in all procedures and activities as needed to successfully carry out the project's goals. These included sharing on a scheduled rotation the necessary equipment and software of the project; attend scheduled inservice workshops; participate in the evaluative procedures of the project; and demonstrate reasonable care and maintenance of all equipment.

b. The district involved in the project assumed the financial cost of substitute pay, not to exceed 3 days of inservice plus necessary travel time to reach Anchorage and return to the respective school. (Initially a two-day inservice workshop in early winter, and a second one-day inservice workshop in late winter.

c. The participating districts designated the teacher who served as an active participant in the project.

The criteria for selecting a participating school included:

1. A school district which demonstrated intent and willingness to participate in the project.

2. Those schools which did not generate any F. T. E. in Vocational Education T. & I. programs during F.Y. 1975-76.

3. To agree that any generated vocational education support funds be returned the following year into continuing Industrial Education programs.

4. Those schools where Vocational Education T. & I. offerings were nonexistent or at least minimal.

5. Those schools with a maximum of 1-5 secondary teachers.

6. Those schools with teaching staff who had little or no expertise in Industrial Education.

7. Schools whose geographic location would provice the maximum challenges in testing the sharing capabilities of the project.

The project officially started in August of 1976 with the hiring of a Project Director, Roy Warren. Initial communication inviting participation in the project, selection of participating REAA's and the first inservice teacher training workshop took place prior to mid November, 1976.

By the end of November, all equipment and programs were in operation at each site. With varied school termination dates found in nine individual school sites, the last scheduled course was rotated on April 22, 1977. Some schools closed their doors as early as May 13th -- with the late start up date of the project and the early closure of some schools, approximately 5/9 of the scheduled course was utilized by every school. A grant requesting a second year of operation was not funded. This resulted in a very limited field test and severely limited the conclusions and generalizations that could be applied to the scarce results data.

Nevertheless, a variety of benefits were derived from this earlier project with respect to any new start up of a similar program. The pilot program clearly established a high degree of receptivity to the use of programmed industrial education modules for rural vocational instruction, teachers, and students. Participating schools expressed a favorable reaction to the program. A management system was established which included the staffing of an outreach coordinator and a central clearinghouse for the programmed modules. This management approach served as the foundation upon which the present model outreach center is proposed. Relationships to vendors of materials was established and could easily be reinstituted. Experience from previous in-service efforts associated with the pilot project has been gained. Support materials, such as interview guides (see Appendix) have been developed for use in Alaska. Various cost factors associated with the operation of such a project are now available based upon this initial project. The need for strengthening relationships with school districts and for the development of

regional support networks have also been recognized.

Problems associated with storage, vandalism, public relations, and lack of good communications have been noted. Experience from this earlier pilot project indicates that several program modules may be too heavy and bulky to rotate. As a result, these specific modules may need to stay at schools, with the sharing of program tapes more in the future. Indeed, much experience in determining rotation schedules, shipping costs, etc. has been gained from this previous pilot project.

A meeting with the former project director of the pilot project and members of The Northern Institute uncovered the following problems associated with those earlier efforts which impact the program significantly:

-- transportation snarls - weather - strikes
-- side-tracked shipments
-- teacher overload attitudes associated with the project
-- storage and set up space problems
-- security of modules and parts
-- need for continual inventory control
-- need to stick to rotation schedules
-- clear working agreements as to who pays for what
-- need for certain audio/visual equipment associated with the modules
-- distractions associated with classroom instruction
-- need to secure long-range commitment among cooperating schools and districts
-- past lack of administrative support at local level
-- need to order training equipment in one large order, shipped in large, secure crate or container to minimize shipping damage and pilferage

-- need for labor and facility space to receive, store, and re-ship equipment to participating school districts and schools

-- need to identify and plan phases of development for students and teacher growth beyond modules

-- need for State Department of Education support and commitment to the program over a longer time period.

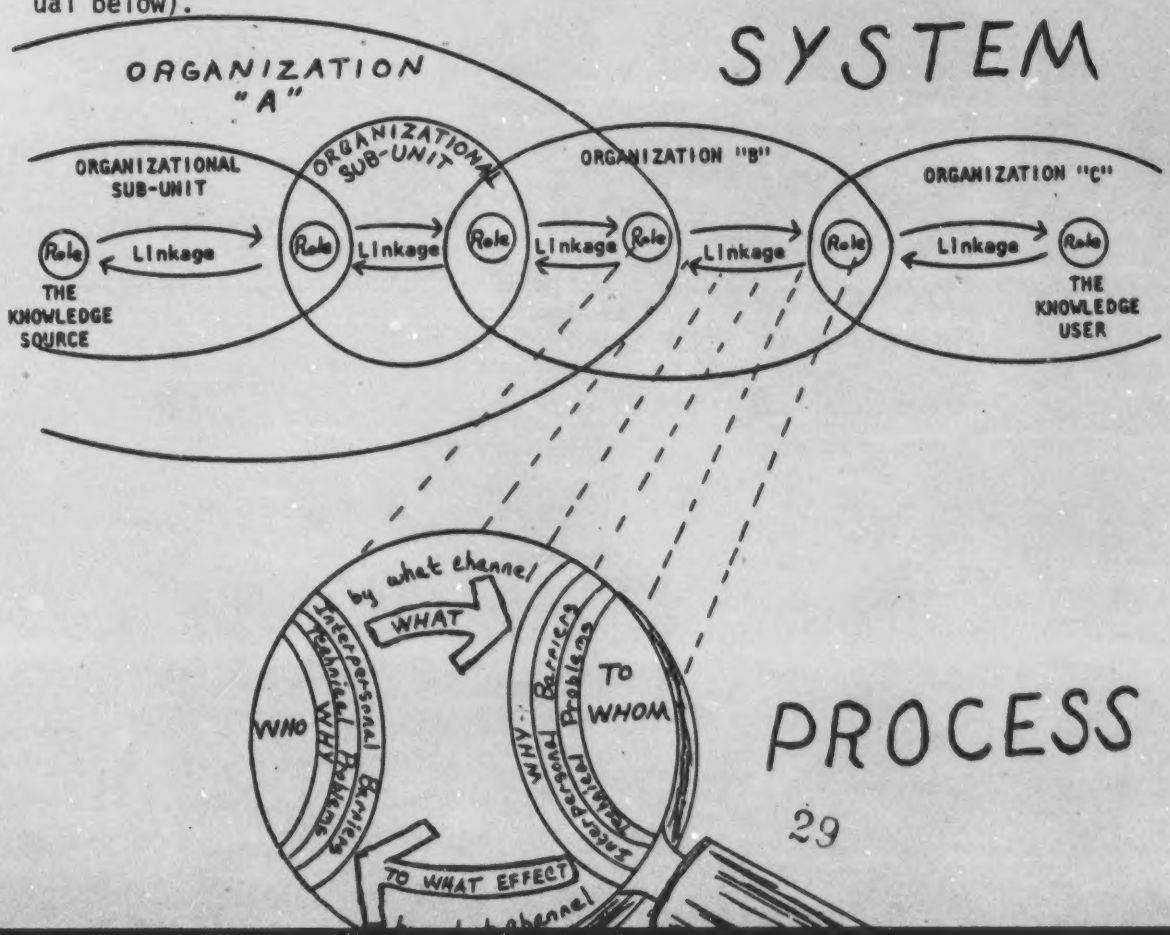
Results from this earlier pilot study clearly indicate the need to focus specifically upon more details within the program, operational components as well as to develop a broader base of a rural support network system that extends beyond the specific project to include cooperating school districts, related agencies at various levels, the coordinating outreach organization, and the Department of Education.

3.0 OUTREACH ARTICULATION MODEL

A Conceptual Base of Development

The knowledge transfer process can best be understood as an interaction or linkage between a potential "user" and a potential "resource", and it can be analyzed into six categories or problem foci by the formula: who says what to whom by what channel to what effect for what purpose (Havelock, 1972, pp. 1-13).

By means of utilizing these basic elements, the transfer process can be expanded to provide a perspective on the social system level (see visual below).



Havelock's research found they were able to classify most research studies according to this formula: 1023 studies seemed to focus on the receiver and his characteristics ("to whom"); 418 studies focused on the sender ("who"); 610 studies were concerned with characteristics of the medium or the strategy ("by what channel"); and 269 studies spoke to the question of goals and results ("to what effect").

Having made this breakdown, Havelock discovered a remarkable consistency: certain things seemed to keep coming up, regardless of the area of focus and regardless of the level of analysis. These unifying themes can be fairly summarized under seven headings which are called the "general factors" in knowledge dissemination and utilization (Havelock, 1972, pp. 11-20). They are listed in very telegraphic form below:

1. Linkage — The number, variety, and mutuality of Resource System--User System Contacts, degree of Interrelatedness, collaborative relationships.

2. Structure: — The degree of Systematic Organization and Coordination:
   a) of the resource system
   b) of the user system
   c) of the dissemination-utilization strategy
   d) of the message (coherence)

3. Openness: — The belief that change is desirable and possible.
   Willingness and readiness to accept outside help.
   Willingness and readiness to listen to needs of others and to give help.
   Social climate favorable to change.

4. Capacity: — The capability to retrieve and marshall diverse resources.
   Highly correllated with this capacity factor are: wealth, power, size, centrality, intelligence, education, experience, cosmopoliteness, mobility, and the number and diversity of existing linkages.

5. Reward: — The frequency, immediacy, amount, mutuality of,

planning and structuring of positive reinforcements.

6. Proximity: Nearness in time, place, and context. Familiarity, similarity, recency.

7. Synergy: The number, variety, frequency, and persistence of forces that can be mobilized to produce a knowledge utilization effect.

By means of developing a matrix between these seven dissemination and utilization factors and the basic elements in the transfer process, a "picture" began to emerge as to those innovations which are most successful in terms of gaining widespread support (see visual, next page). The importance of such research has major implications for the manner in which any industrial education outreach center is developed. It clearly demonstrates that the process by which any innovation is transmitted is as important as the specific program or context of the innovation. As a result any outreach model should address these very basic elements and factors.

Units of Social Interaction*

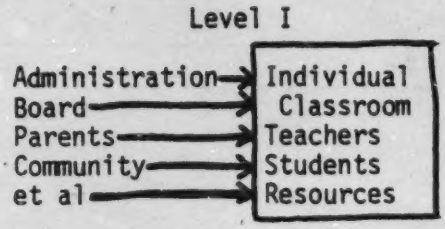
Within the overall context of the proposed industrial education outreach center various levels of social interaction are likewise important to recognize. These levels range from the small nucleus of the vocational educational classroom (Level I) to that of a statewide coordinating center (Level VIII). The delivery of services and programs is thus contained within various levels of social interaction which are in turn affected by such factors as distance, internal/external control, political similarities/differences, communications, training, and work loads.

*developed by Ray Lehrman and John Warden

How General Factors Relate to:

GENERAL D&U FACTORS	RESOURCE PERSONS & SYSTEMS --- SENDERS-DISSEMINATORS (Who)	USER PERSONS & SYSTEMS --- CONSUMERS-CLIENTS (To Whom)	MESSAGE --- KNOWLEDGE INNOVATION (What)	MEDIUM --- CHANNEL-STRATEGY - TACTICS (How)
1. LINKAGE	Collaboration, 2-way interaction with user and other resources. Simulation of user's problem-solving process.	Collaboration, 2-way interaction with other users and resources. Simulation of resource system's R&D process.	Relevance to user. Adequacy of derivation and congruence with scientific knowledge.	Allows direct contact. Two-way interaction.
2. STRUCTURE	Systematic planning of d&u efforts. Division of labor and coordination.	Systematic planning and execution of problem-solving efforts. --- Integrated social organization of receiver system.	Coherence. Systematic preparation (design, test, package).	Systematic strategy. Timing to fit user's problem-solving cycle.
3. OPENNESS	Willingness to help. Readiness to be influenced by user feedback and by new scientific knowledge. Flexibility and accessibility.	Willingness to be helped, desire to change, to see potential of outside resources. Active seeking and willingness to adopt outside resources.	Adaptability, divisibility, demonstrability of the innovation.	Flexible strategies. Best medium allows informal communications between sender and receiver about the innovation.
4. CAPACITY	Ability to summon and invest diverse resources Skill and experience in the helping-resource person role. Power, Capital.	Ability to assemble and invest internal resources. Self-confidence, intelligence. Amount of available time, energy, capital. Skill, sophistication.	Innovations which result from heavy investment and sophisticated design and development will diffuse more effectively.	Capacity of medium to carry maximum info. Accessibility to maximum number of users in minimum time.
5. REWARD	Reward for investment in d&u activities in terms of dollars, recognition, knowledge, self-esteem.	Past experience of reward for utilization effort. Return on effort invested in dollars, time, capacity, growth, well-being.	Relative advantage, profitability. Time and labor saving potential. Life-liberty-happiness benefit potential.	Medium which can convey feedback (+ and - reinforcement). Most effective medium has best reward history for sender and receiver.
6. PROXIMITY	Closeness and ready access to diverse resources and to users.	Closeness and ready access to resources, other users. Cosmopoliteness. Psychological Proximity: similarity to, and identification with other users, resources.	Relatedness and congruity with user and user needs. Similarity and congruence with past innovations which the user has adopted. Familiarity to user.	Easily accessible medium, familiar to the user.
7. SYNERGY	The number and diversity of resource persons and change agents who gain access to the user. Continuity, Persistence, and Synchronization of effort.	The number and diversity of different users reached will accelerate the diffusion to social system as a whole.	Redundancy of message. The number and variety of forms in which the message appears and the continuity among forms.	The number and diversity, continuity and persistence of different media used to transmit the message.

As level I (the classroom) proceeds to interact with higher levels, the degree of formality and the need for structure increases. The level of communication also shifts from the informal toward the formal and spatial problems begin to emerge. With respect to an industrial education outreach system consider the levels and generalized features.



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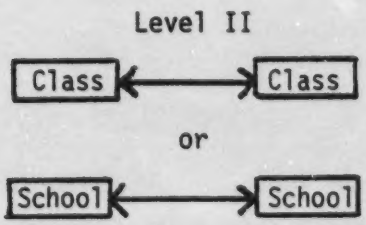
Classroom unit

One rural vocational education class using self-contained instructional education programs

The focus is upon the teacher and students with outside influence factors. Needed are teacher competencies for educational instruction and social interaction with students. Students in turn must develop industrial education competencies. Student and teacher learning is evaluated. Materials are housed safely. Changes are made in procedures, content, schedules, materials, etc. as deemed appropriate and necessary. High reliance on verbal and written communications (tests, papers, reports). In teaching students the teacher advances individual personal skills. Assistance may be sought from outside sources. The primary focus, however, remains upon student/teacher relationships.



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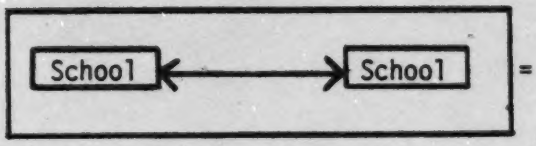
Shared Pair

Shared pair of classes or schools in one community (easily shared)

Focus includes both internal and external relationships. A common mis-

sion may begin to emerge among schools. Schedules may be coordinated. Supplies and equipment may be shared or exchanged. Shared decision making, knowledge, skills, results, techniques, ideas are likely. Visitation and synergistic relationships emerge. Small informal relationships between students and teachers are still the primary mode of operation.

Level III



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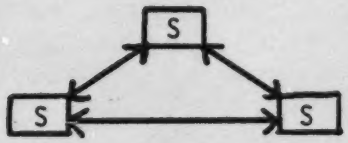
Partnership

Two-community partnership with schools (less easily shared)

Proximity factors begin to influence interaction to a higher degree. Communications may be more difficult but still informal to a high degree.

Level IV



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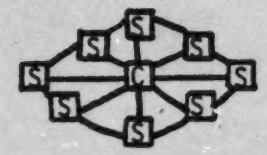
Trio of communities and schools with evolution of coordinated management system (perhaps LEA)

Potential for common mission strengthened. More sets of input and broader experience base. Student options increased. More external interaction possible. More economical costs per student. Decision making and problem solving among units requires more time and resource allocation. Transportation and spatial problems emerge. Potential for variance increases and conflict for resources affected. Outlook shifts from internal to external. Movement from informal to formal management may be evident.

Beginning evolvement of a district wide perspective that may or may not result in the formation of a formal, rural education administrative unit such as LEA.

Level V

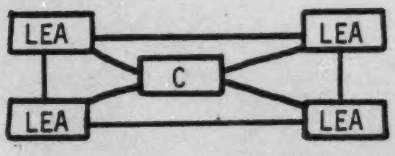


= local educational district with 4-9 schools (or more)

S= School
C= Coordination/Management Office

Increased need for teacher inservice due to increasing staff turnover potential. Student and teacher options may be increased. Need for formal structure becomes evident. Formal management and coordination assume a higher priority. External controls related to funding base assume higher priority. District wide goals and objectives emerge. Increased likelihood of interdependence among various schools. Communication becomes more formal and external linkage factors emerge.

Level VI

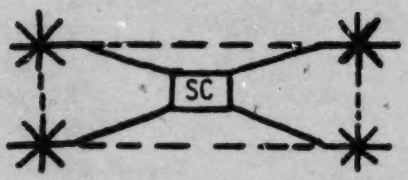


= Regional coordinating center of unit composed of three or more LEAs

C = Coordinating Organization

Emergence of specialized coordinating organizations. Potential for increased staff development and inservice. Capacity building and linkage factors become increasingly important. Potential for more formalized communications. Cultural and geographic similarities and/or differences become important. Distance and proximity may affect services delivered. Shipping, the weather and transportation assume high importance. Capacity for specialized assistance may be increased (see visual, next page).

Level VII



= State coordinating center or unit composed of three or more Regional centers.

SC = State Coordinating Organization

Physical distance becomes primary inhibiting factor. Reliance upon written and telecommunications increases. Need for specialized training of smaller unit coordinating personnel assumes increasing importance. Development of formal structures to coordinate increases. External controls and funding sources assumes higher priority. Need for coordinated delivery of services and statewide leadership development emerges. Complexity of political elements increases.

Toward A Model Outreach System For Rural Industrial Education

An ideal model of development includes a "systems approach". A system is the sum total of parts working independently and working together to achieve required results based upon needs. An outreach industrial education system includes all of those various interacting social units identified in the previous section (students, teachers, administrators, etc.) operating in the context of who does what to whom by what channel to what effect. In addition the elements of linkage, structure, openness, capacity, reward, proximity and synergy must be interwoven. As a result, the following "ideal conditions" are worth working toward.

I. Improved industrial education occupational competencies. The end result of the outreach system must be the attainment of teacher and student compe-

tencies related to various industrial education occupations. For the rural industrial education teacher at the local school level this is to accomplish the following:

-- Obtain technical knowledge in the operation of the program modules

-- Set up learning stations

-- Promote the program to parents and the community in general

-- Improvise and solve problems related to materials, equipment, and other procedures.

-- Assess and identify community resources which can supplement the program modules

-- Devise ways in which the program modules can be utilized by adults as well as students

-- Conduct needs assessments in the community

-- Utilize pre- and post-test instruments

-- Maintain effective record keeping procedures

-- Maintain inventory control on all materials and supplies

-- Forecast future module requirements

-- Provide guidance in instruction

-- Obtain both an historical and future orientation with respect to rural industrial education in Alaska

-- Establish rotation schedule for use by students of learning modules

-- Re-package modules for re-distribution to other sites

-- Evaluate effectiveness of learning modules

-- Encourage desireable work habits on part of students

-- Locate proper physical space for learning stations

-- Maintain good communication with district administrator and outreach center

- -- Locate sufficient storage space of modules
- -- Develop proper safety precautions for use of materials

For students enrolled in the rural industrial education program via the programmed modules, the following goals and objectives are sought (Hillway, p. 4-2):

- -- Obtain knowledge of specific skills associated with industrial education modules including:
  - -- Skills of disassembly, inspection, assembly
  - -- Theory of operation
  - -- Skills of care and maintenance
  - -- Recognition of worn and/or faulty components
  - -- Proper nomenclature
  - -- Some repair techniques
- -- Improve study habits through learning
  - -- Ability to follow directions
    - -- Improving listening skills (audio)
    - -- Improving reading skills (visual) (The ability to see and comprehend what you are looking at.)
  - -- Hands-on approach (Learning by doing.)
  - -- Vocabulary and spelling (Use of worksheets, nomenclature, the language of the trade.)
  - -- Related-study research
    - -- Use of manuals and parts catalogues
    - -- Inter-disciplinary needs
      - -- mathematics skills
      - -- communications skills
    - -- Developing the workbook
      - -- future reference
      - -- future job application
- -- Improve working habits by
  - -- Attention to directions/orders
  - -- Use of systematic approach (Proper procedures)
    - -- Use of methods accepted and prescribed by industry/manufacturers
    - -- Orderliness (One-step-at-a-time orderly progression to avoid omissions.)
    - -- Neatness (Use of parts pans etc.)
  - -- Care of tools, parts, equipment, tapes, slides

- -- Clean-up procedures
- -- Sense of timing (Finishing the job on a reasonable time schedule.)
- -- Checking one's work

-- Develop work attitudes by

- -- Accepting direction and corrections (Student response/ reinforcement system.)
- -- Accepting fellow workers (Working together as a team.)
- -- Attention to assigned activity (This is a measure of the interest one has in the activity he is pursuing and can readily be gauged by the amount of disinterest demonstrated or the distractions created.)
- -- Achieving success

-- Obtain an opportunity to experience first-hand aspects of the occupation which will fortify or discourage aspirations with respect to career decision making.

-- Obtain basic safety practices related to various occupational choices.

II. Improved delivery of overall vocational education services, particularly industrial education, through fostering the development of a support system. This includes:

-- increasing intra-district cooperation

-- increasing inter-district cooperation

-- developing knowledge sharing procedures among LEA which have industrial education projects

-- reducing a sense of isolationism

-- sharing occupational information related to industrial education at various levels throughout the state

-- reducing material costs by increasing sharing procedures among participating organizations and agencies

-- strengthening field services and in-service teacher education associated with industrial education

-- improving and strengthening needs assessment and evaluation procedures at the local, district and regional level

-- reducing interagency conflict due to unnecessary competition and duplication of services

-- utilizing various telecommunication procedures as means of strengthening over communication and delivery of services

-- educating and training local administrators in the development of a supportive team effort at the local level

-- maintaining local autonomy and control over the specific industrial educational program

-- maintaining clear, concise and understandable goals for the program which can be shared with others

-- enhancing the ability of local school districts in the generic areas of problem solving, decision-making and planning

-- maintaining a geographical size which is practical, workable, and has the support of those participants involved

-- encouraging involvement and participation at all levels of interaction

-- maintaining flexibility to respond to immediate and changing needs

-- opening communications with a variety of population groups

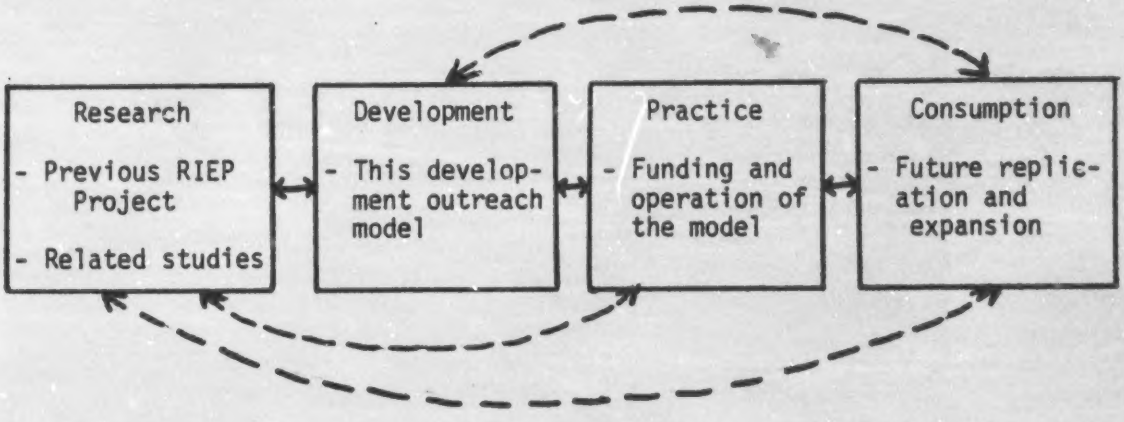
-- building off the strengths of individuals, organizations and communities

-- facilitating as well as providing service functions

III. Improved interpersonal relationships at all levels within the system. Simply stated this means it is important to recognize the human condition which makes the entire system operational. Improved personal relationships between students and teachers, teachers and administrators, etc. are a necessary corollary to an effective, well-functioning community of people. While it is unnecessary to dwell upon this aspect in too much detail it is important to recognize the central role which this plays in the operation of the entire system. People are what make things happen!

IV. Some other special considerations.

A. Relationship of research, development, practice and consumption. The operation of an outreach model should be recognized in the related contexts of research, practice and consumption. This developmental model, as an illustration, is based upon previous projects in Alaska and Oregon. The funding of the model will in turn lead to practice (actual operation) and possibly to wider consumption (future replication and expansion). Thus this outreach model system is only part of a larger picture. (See visual from Havelock, 1972, pp. 3-4.)



B. Focus beyond a center. While an outreach center is a proposed part of this outreach system they are not one and the same. The outreach center is only one part of the larger outreach system. The center will surely play a major role in helping facilitate the system in actual operation but all the various social interaction levels are likewise a part of that system.

C. Outreach center size and location. Previous experience tends to support the initial establishment of an outreach center to serve a limited

number of school districts in a geographically similar region. Best estimates would ideally include three rural LEAs each with five to seven schools.

D. Phases of development. Since the overall emphasis is upon creating a system rather than merely an outreach center, development and funding patterns should be taken into account various operational functions which will change from year to year. For example, in the initial phase of re-establishment of the rural industrial outreach center (Phase I) it is proposed that the center will serve in a very direct service role to the LEAs. Activities proposed for the project coordinator during this initial phase of development are very similar to the past industrial education project. They include the following:

-- Establish schedule of rotation of learning materials

-- Interview teachers, local administrators and students regarding vocational needs related to the occupational modules

-- Locate vendors of materials and undertake order of all materials

-- Conduct in-service workshops associated with use and administration of the materials

-- Coordinate interdistrict rotation of materials and the replacement of consumable supplies

-- Facilitate the development of a regional support network or system for project continuation and mutual interdistrict cooperation

-- Evaluate various shipping procedures with regard to the rotation of materials and related costs

-- Develop good communication with district administrators, teachers, school boards and others related to the program

-- Develop an overall awareness of the program in the region with other agencies and organizations which might be drawn into a more stable support system

-- Locate sufficient storage space for materials at the central coordinating center

-- Develop monthly reporting and accountability procedures

-- Investigate and study manpower needs associated with vocational education related to rural programmed instructional materials

-- Conduct district and regional planning sessions associated with the project

-- Prepare project guidelines and resource materials in cooperation with districts

-- Conduct evaluative studies of the program materials

-- Prepare budgets and write proposals

-- Maintain a record keeping system for the program

-- Attend statewide meetings on the application and use of the program for vocational education and rural outreach in general

-- Establish and apply policies with respect to project management

-- Acquire knowledge of the technical skills associated with various occupational modules

-- Develop various needs assessment models for use at the local community level

-- Assess local needs informally through contacts with parents, students, teachers and community

-- Undertake various written communications on the program and how it operates

-- Acquire knowledge of rural school districts and community including cultures, programs, and people

-- Utilize verbal skills in conducting meetings, maintaining good interpersonal relations and explaining the overall program

-- Acquire knowledge of vocational education beyond industrial education

-- Work with state and regional agencies in coordination of future plans

-- Participate in professional meetings for self-improvement

(Further explanation of the goals, objectives, operational procedures are included later with this proposal.)

Phase I is thus a very direct way of getting a specific program underway while beginning to work toward the establishment of a broader system of support and involvement (see visual, next page).

PHASE II AND III

During Phase II developmental focus shifts somewhat. Here the focus of attention and work is upon the establishment of an intermediate regional center (perhaps a community college, regional resource center, or other organization) which can take over many of the regional functions necessary for the development of a support system within that regional area. The rural industrial education outreach center will also focus upon establishing a new network of support within a different region as well. The center will be somewhat more removed from the local level of operations and be more focused toward developing a statewide support system of outreach.

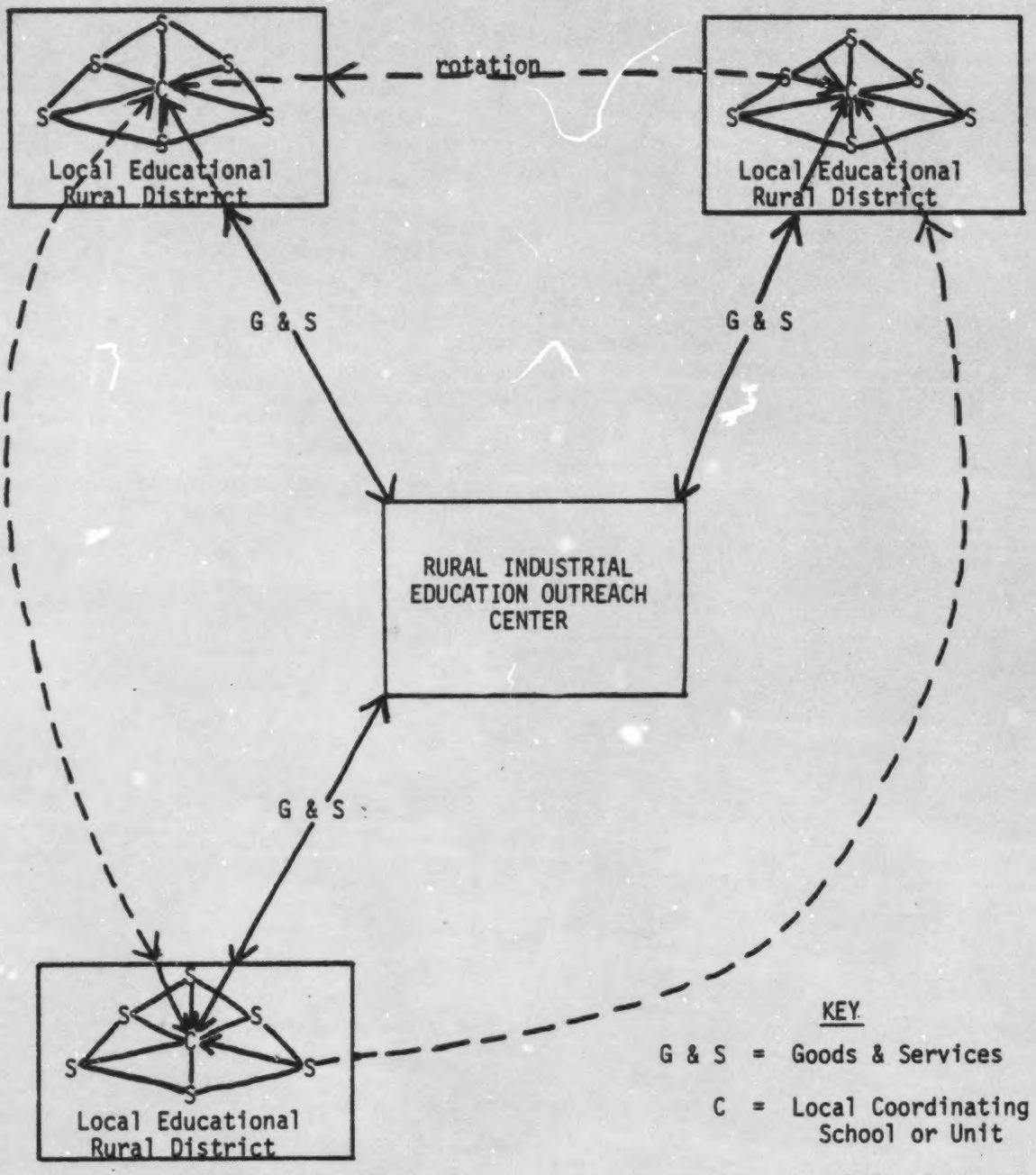
In Phase III the outreach system will be further extended to serve an even more statewide focus. It is projected that the center will continue to achieve reduced costs and develop in-state supply capabilities. It should be noted that these phases of development are open to further modification and changes as the project progresses.

It should be further indicated that each of these phases is based solely upon the success of each preceeding phase and will not be undertaken

unless fully supported and funded by the appropriate sources. Nor should it be implied that each phase represents a year's worth of work. Expansion of the outreach center role and duplication of additional regional centers will only be undertaken if the overall project meets those criteria listed in the Vocational Education Plan (FY 78-82) and funds become available. However, the reason for including such a plan is to clearly indicate how this project proposal can contribute to a somewhat larger perspective for overall statewide improvement of industrial education as it relates to rural areas.

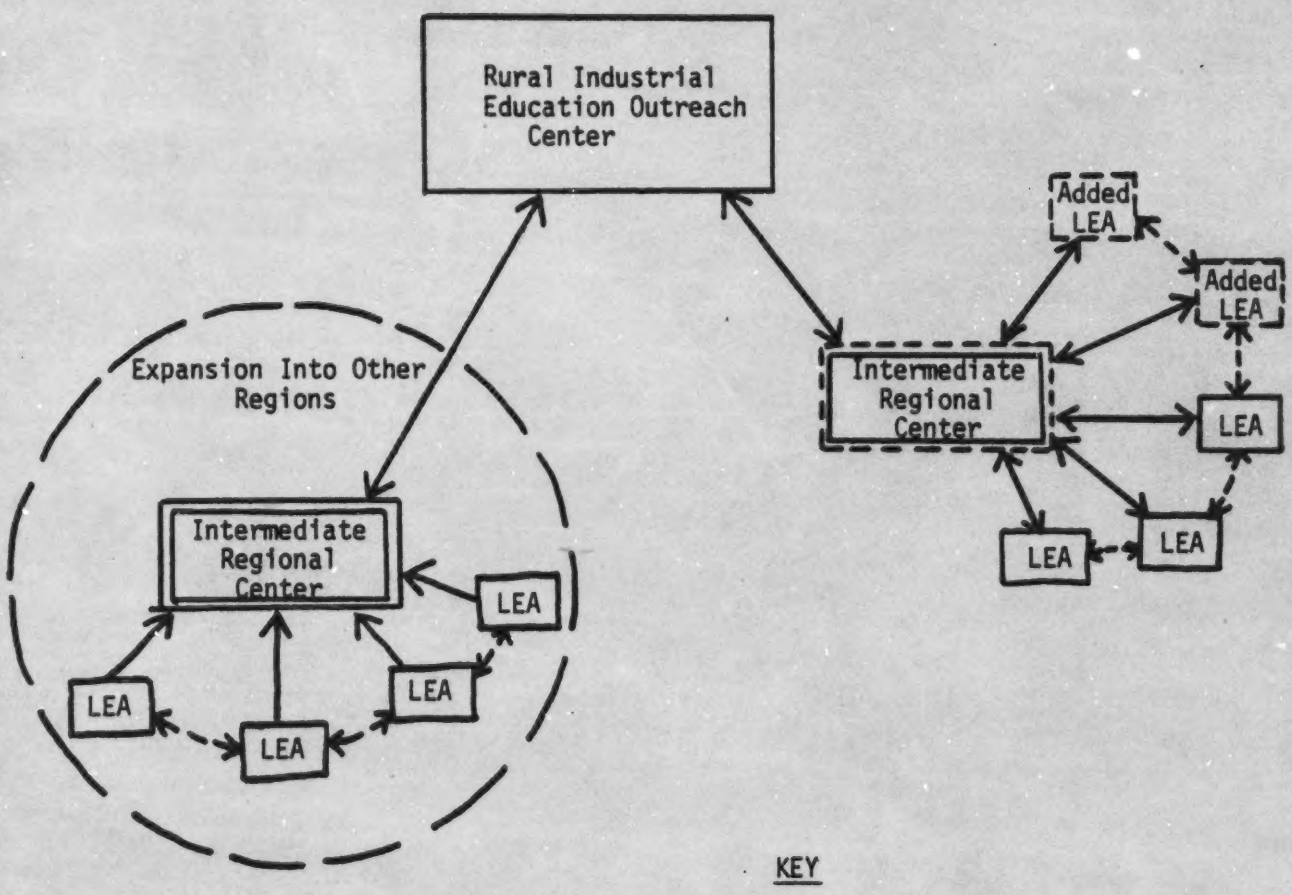
LIMITED ONE REGION OUTREACH SYSTEM

PHASE I



EXPANDED OUTREACH SYSTEM

PHASE II

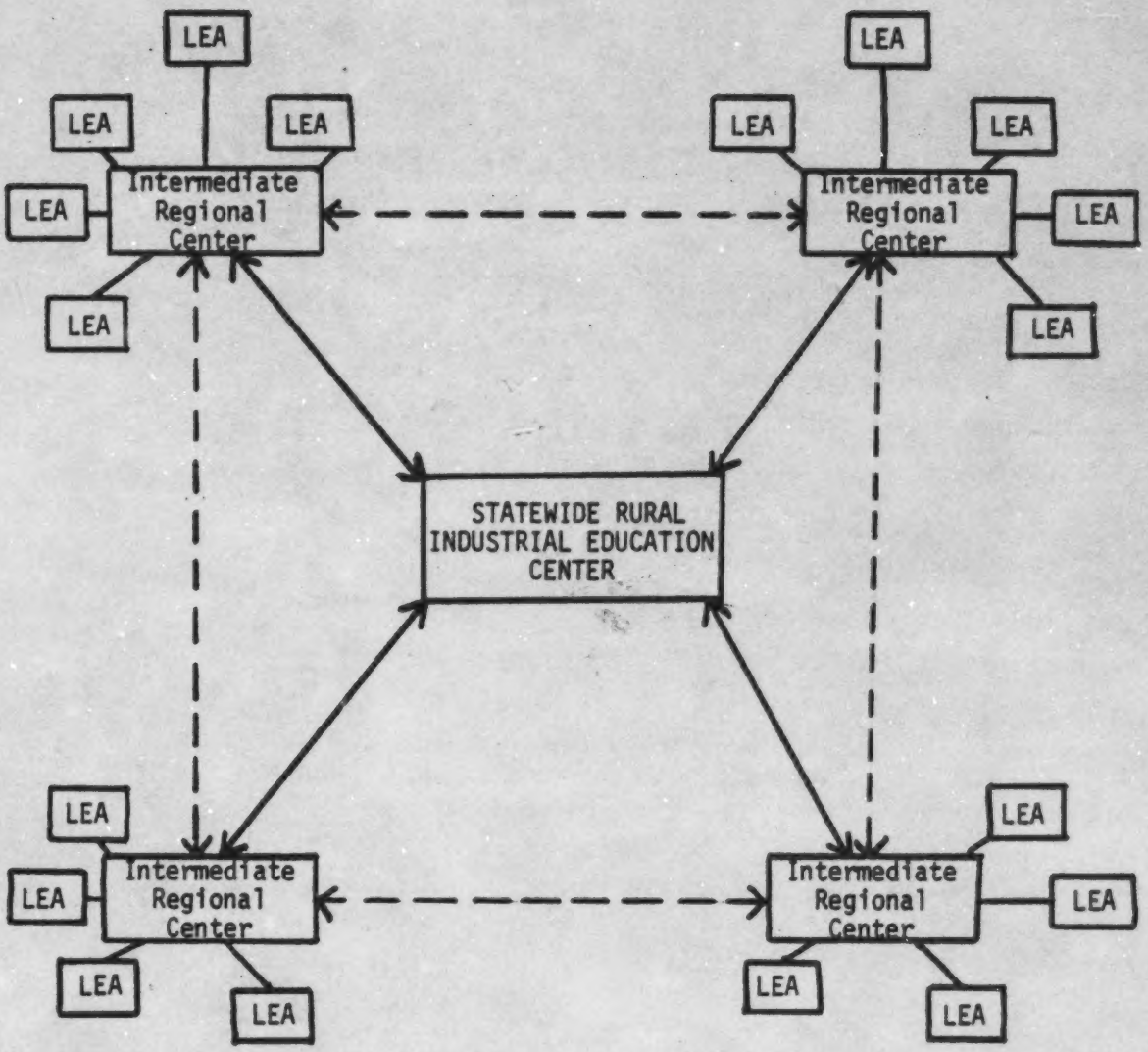


KEY

LEA = Local Education Agency

STATEWIDE OUTREACH SYSTEM

PHASE III



4.0 GOALS

The overall mission of the proposed project is to improve vocational education in rural Alaskan schools. The general goals which emerge for instituting the Rural Industrial Education Outreach Program for the first year of operation are as follows:

I. To design, implement and evaluate a model outreach center in industrial education for a selected rural region for possible replication elsewhere in Alaska.

II. To improve both the quality and quantity of industrial education occupational competencies delivered to students and teachers in three local education districts of a similar rural region of Alaska.

III. To improve the overall development of industrial education programs by fostering the development of a support system within a selected rural region of Alaska.

These goals are part of a larger articulation model expressed in the previous section.

5.0 OBJECTIVES

Goal I: To design, implement and evaluate a model outreach center in industrial education for a selected rural region for possible replication elsewhere in Alaska.

Objective I.1 To undertake an assessment to determine which rural school districts would desire the services and be willing to participate in a rural outreach center.

I.2 To establish a rural outreach center in Industrial Education to serve a specified region with a minimum of three rural school districts.

I.3 To evaluate the effectiveness of the outreach center and its personnel with regard to the delivery of services and facilitative functions undertaken.

Goal II: To improve both the quality and quantity of industrial education occupational competencies delivered to students and teachers in three local education districts of a similar rural region of Alaska.

Objective II.1 To assist in the conducting of local community needs assessment to determine curricular direction.

II.2 To identify and purchase industrial education materials of common interest to cooperating school districts.

II.3 To design all programs among the cooperating school districts to utilize competency-based and individualized instruction.

II.4 To provide orientation and in-service training for all teachers involved in the project.

II.5 To assist students and teachers in the assessment of the instructional materials as well as assessment of personal competence attained through the instructional programs.

Goal III: To improve the overall development of industrial education programs by fostering the development of a support system within a selected rural region of Alaska.

Objective III.1 To establish a schedule for rotation of the instructional materials.

III.2 To work with districts on the internal scheduling of the instructional materials.

III.3 To involve a variety of other agencies and organizations that can become supportive and involved on the regional level in order to optimize use of resources in rural communities.

III.4 To involve local community residents in the design, implementation and evaluation of the program (including but not limited to students, teachers, administrators, parents, business and industry representatives, native corporations) in order to optimize use of resources in rural communities.

III.5 To provide an evaluative process to assess the expansion, replication, or termination of the project.

6.0 DELIVERY SYSTEM

Tasks

Specific tasks to be completed with respect to those objectives are listed in Havelock's context of who transfers what by what channel to whom to what effect. In this manner the outreach project assumes a broader systems approach beyond a center level of operations. Key participating parties include: 1) students, 2) teachers, 3) local administrators, 4) parents, 5) citizen groups, 6) school boards and school committees, 7) center outreach personnel, 8) material vendors, 9) related regional agencies and organizations, and 10) state agencies. A variety of people contribute not only to the input of operations but throughput and output as well (see visual below). Only in this manner can a broad coalition of support be developed for the operation aspects of the program and lead to the development of a viable support system.

Input	Throughput Model Outreach Center	Output
Students		Trained students
Teachers, Parents	Industrial material support	Competent teachers
Administrators	Management systems and schedules	Supportive administrators
Other local to regional organizations	Technical assistance	Supportive network development
Instructional material firms/companies	Training	Informed community
Dept. of Education	Planning and development	Replication elsewhere of model
Business & Industry	Communications	
School Boards/Committees Citizen groups	Evaluation	

RURAL INDUSTRIAL EDUCATION OUTREACH SYSTEM

TARGET GROUPS AFFECTED

WHO	TRANSFERS WHAT?	BY WHAT CHANNEL	TO WHOM	TO WHAT EFFECT?
		Junior and senior high students		
Local rural industrial education teachers	Industrial education curriculum	Automated teaching systems and other programmed instruction in industrial education	Junior and senior high school students	Basic competencies in industrial education occupations
Local rural industrial education teachers	Knowledge of related occupations in the community	Personal contact and field visitations	Junior and senior high school students	For possible follow-up occupational guidance and work
		Adults as students		
Local rural industrial education teachers	Industrial education curriculum	Automated teaching systems and other programmed instruction in industrial education	Adults	Basic competencies in industrial education occupations
		Local teachers and administrators		
Coordinating outreach center personnel	Knowledge or use of materials and sharing procedures	In-service workshops	Local teachers and administrators	Improve local use of materials and enhance sharing among schools
Coordinating outreach center personnel	Community assessment procedures	Written sample assessments and guides Visitations	Local teachers and administrators	Improve local program by meeting individual community needs
Coordinating outreach center personnel	Updated, renovated, and consumable support materials	Air or rail, etc.	Local teachers and administrators	Replace and maintain a supply of materials related to automated teaching system
Coordinating outreach center personnel	Knowledge and personal advice on program operational procedures	Field visitations	Local teachers and administrators	Assist in solving technical problems associated with project

WHO →	TRANSFERS WHAT? →	BY WHAT CHANNEL? →	TO WHOM →	TO WHAT EFFECT?
Local teachers and administrators (continued)				
Coordinating outreach center personnel	Aid with evaluation design	Field visits and written respondence	Local teachers and administrators	Improve local program operational procedures and assess overall effectiveness
Coordinating outreach center personnel	Planning models and materials	Written guides	Local administrators	Develop procedures for program expansion and revision
Local businesses and industry	Knowledge of skilled occupational needs	Personal contact and committee meetings	Local administrators and teachers	Keep informed of local skilled occupational needs related to industrial education
Local industrial education teachers	Information on material needs related to project	Personal contact phone	Local administrators	Inventory of needs clearly identified
Students and adults	Assessment of automated teaching systems material	Written instruments	Local teachers	Determine usefulness of individual teaching modules
Local educational agencies				
Coordinating outreach center personnel	Automated teaching systems materials	Air or rail, etc.	Local education districts	Reduced costs due to inter-district sharing procedures
Coordinating outreach center personnel	State labor status and information	Written and personal contact	Local education districts	Develop awareness of state wide occupational needs at the local level
Coordinating outreach center personnel	Cost/benefit data analysis	Written reports and communications	Local educating districts and Department of Education	Determine feasibility and desireability of continuation, replication, expansion

WHO →	TRANSFERS WHAT? →	BY WHAT CHANNEL? →	TO WHOM →	TO WHAT EFFECT?
		Local community groups		
Local educational administrator	Knowledge of local RIEOP	Committee meetings, formal and informal personal contacts	Local community at large (including school committees, businesses, industry)	Inform people of the program and gain local community support
Local educational administrator	Knowledge of local RIEOP	Personal and written communication reports	School board and curriculum committees	Incorporate and articulate the relationship of RIEOP to school curriculum and graduation
Local industrial education teachers	Knowledge of local RIEOP program	Personal contact	Local business, government and industry	Gain feedback on modifying program to meet local community needs and follow-up field experience possibilities
		Regional Groups		
Rural LEA schools	Automated teaching systems materials	Rotation schedule by air, rail, water, or road	Other cooperating schools	Expanded material occupational options for students and teachers
Coordinating outreach center personnel	Knowledge of LEA operational projects of the automated teaching systems of industrial education	Personal contact and written communications	Various agencies and organizations within the regional areas	Improve interagency cooperation and further involvement
Coordinating outreach center personnel	Knowledge of possible resource linking	Written and personal communication	LEAs and regional agencies	Future collaborative sharing possibilities explored

WHO → TRANSFERS WHAT? → BY WHAT CHANNEL? → TO WHOM → TO WHAT EFFECT?

Outreach center personnel

Various material vendors of programmed instruction in industrial education	Specific information and costs of various materials	Written booklets and price sheets	Coordinating outreach center personnel	Provide information on new materials for possible purchase and use
State occupational information coordinating committee	Updated information on state occupational employment needs	Phone and written communication	Coordinating outreach center personnel	Keep informed of occupational needs which can in turn be shared with LEAs
Local education administrator	Knowledge of local facilities and storage space	Phone and written communication	Coordinating outreach personnel	Shipment of automated teaching systems impacted
Teachers and local administrators	Assessment of automated teaching systems material	Written instruments	Coordinating outreach center personnel	Determine usefulness of individual teaching modules
Local industrial education teachers	Knowledge of in-service needs	Personal and written communications	Coordinating outreach center personnel	Keep informed of in-service needs to improve local program
Local industrial education teachers and administrators	Knowledge of local RIEOP operations	Personal and written communications	Coordinating outreach center personnel	Keep informed of project status and possible promising practices
LEAs	Budget information	Written and personal communication	Coordinating outreach center personnel and other school districts and regional agencies	Future cost sharing arrangements among districts and agencies
Regional service agencies (Regional Resource Centers, Community Colleges, etc.)	Knowledge of regional capabilities in delivering various sources	Written and personal communications	LEAs and coordinating outreach center personnel	Future development of cooperative support network within the region

WHO → TRANSFERS WHAT? → BY WHAT CHANNEL? → TO WHOM → TO WHAT EFFECT?

Statewide agencies and organizations

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Coordinating outreach center personnel	Information on outreach center past and planned functions	Monthly report	Department of Education	Maintain up-dated information on outreach system
Coordinating outreach center personnel	Local evaluation report of LEAs	Written correspondence	Department of Education	Inform DOE for program progress and future plans of existing LEAs
Coordinating outreach center personnel	Knowledge of local RIEOP	Newsletter(s)	LEAs and state agencies	Keep informed as to local program developments
Coordinating outreach center personnel	Knowledge of teacher competencies connected with automated teaching systems	Written reports	Higher education institutions	For possible inclusion in curriculum for rural vocational education teacher in industrial education
Coordinating outreach center personnel	Knowledge of alternative delivery networks	Written reports and personal contact	LEAs regional organizations higher education institutions	Future development of the regional network
Coordinating outreach center personnel	Additional automated teaching systems desired	Written communication	Department of Education	Expansion of optional vocational programs made available to local LEA
Coordinating outreach center personnel	Knowledge of local RIEOP	Written communications	Commission on Promising Practices	Point out LEAs as possible demonstration of promising practices

Subphases of Development

Major milestones during the first year of implementation are illustrated below in four subphases. Subphase A focuses attention upon the initial funding and establishment of the outreach center. This subphase includes hiring personnel, ordering equipment and materials, developing working schedules, developing agreements with LEAs, contacting other agencies and developing communication networks. Subphases B and C focus upon actual program planning and implementation as well as related support services. Subphase D focuses attention upon further development and expansion beyond the initial year of funding. This subphase also includes a re-evaluation of the center's changing role during the following year of operation (provided a second year is merited).

Stages of Development

Phase I

Subphase A — Fund and Establish Outreach Center

- Hire personnel
- Develop working schedule agreement with LEA
- Undertake initial needs assessment
- Order equipment/materials
- Develop contracts with other agencies

Subphase B

- Develop good human relations at field level
- Program planning
- Inservice training for teachers/administrators
- Field visitations/teaching/assistance
- Rotation of equipment materials
- Information dissemination

Subphase C

- Support facilitation
- Inventory/replace materials
- Problem solving
- Decision making
- Evaluate materials/programs
- Disseminate results
- Compile cost/benefit data

Subphase D

- Undertake expansion, replication plans
- Review orders/outreach roles and functions
- Identify resources

Factors Which Facilitate Development

Listed below are a variety of factors which are projected as facilitators or impeding development during the first year of operation.

Support of local school districts. In order to obtain maximum impact, rural school districts will need to assume an active partnership in the planning and operation of the outreach system. This means willingness to not only become a participating member but also the working out of such matters as:

1) Sharing existing in-district equipment with other districts;
2) Offering advice on the purchase of new materials;
3) Permitting teachers and administrators to attend in-service training sessions;
4) Relating the proposed project to graduation requirements;
5) Evaluating the overall effectiveness of the program at the local level;
6) Freeing up the time of a staff person to serve as a coordinator of the rotation schedule of materials internal within the district's schools.

The last area is particularly important if the maximum benefits are to be derived at the local classroom level. For example, the amount of time recommended for as in district coordinator varies from a district with three schools (coordinator .33 FTE) to a district with 7-9 schools (coordinator 1.00 FTE). Several school districts in a similar region may wish to combine forces to provide their very vital local coordination.

Development of interdistrict cooperation. An additional key to success is

the development of cooperative efforts at the interdistrict level with respect to scheduling, sharing of specialized materials, possible field trips, cooperative in-service training and overall operational agreements.

Support of other agencies and organizations. A key supportive role can be played by regional resource centers, community colleges, native corporations, various social service agencies (i.e. department of labor) in the overall operation of this project. Indeed, the development of a support system requires both active participation and involvement on the part of many such agencies. Limitations associated with past efforts have often been due to lack of development of such a support network.

Support from Department of Education and other funding sources. The present grant cycle of one year is too short to accomplish many of the longer range developmental efforts necessary for the effective development of a support network and system. One year funding insures a short focal point of development based primarily upon establishing a program. All energy tends to be directed to initial development, operation and program survival. As the Department of Education or any other funding agency decides to support this rural industrial education project, serious consideration should be given to possible multiple year funding either on an actual or implied basis. Research clearly has indicated that too often innovative programs have not been given adequate time to develop necessary support networks and prove themselves as a viable alternative.

Constraints and Limiting Factors

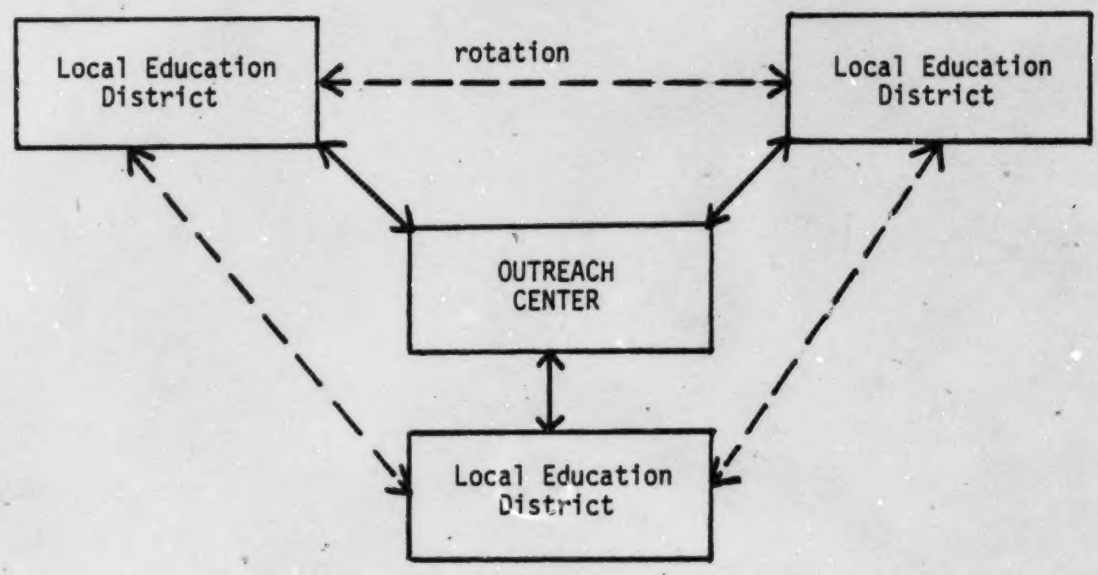
The proposed outreach model is presently limited to a focus upon

Industrial Education rather than the overall, broader field of vocational education. Furthermore, the outreach program is based upon the utilization of presently developed commercial software materials (i.e. Ken Cook, Tomahawk) which have some restrictions with regard to occupational clusters available. Heavy weight and bulkiness of some occupational instructional materials may necessitate the permanent stationing of specific materials at a particular location rather than school-to-school rotation. Some limitations will also be noticeable due to the rotation schedule itself which will require advance planning on the part of all involved.

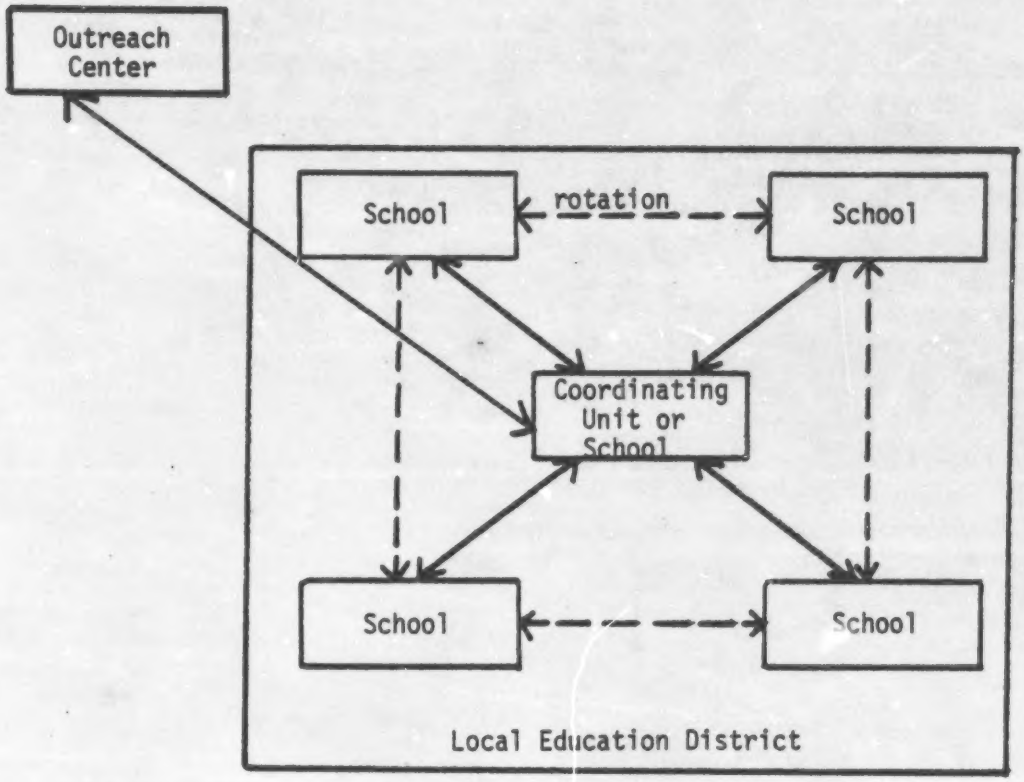
7.0 MANAGEMENT PLAN

The Outreach Center will serve as the central coordination hub for the distribution of materials and the establishment of a rotation schedule. The center will also perform a variety of other services and act in a facilitative role as indicated earlier. The proposed management plan for this first year is based upon the cooperative actions of three educational school districts. Material will be distributed both internally within the districts and among districts on a regular scheduled basis (see visuals below).

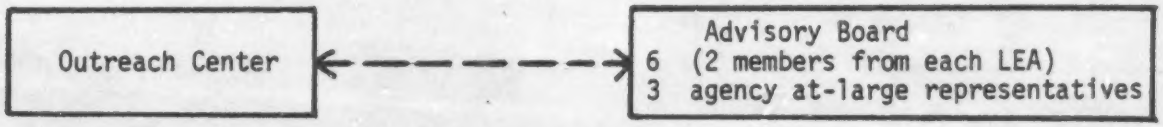
Interdistrict Level



Intradistrict Level



If nine schools participate in the project, a rotation schedule similar to the enclosed example could be utilized. The specific occupational modules would be agreed upon by participating districts through an advisory committee linked to the Outreach Center. This group would be composed of representatives from each of the participating districts as well as three at-large delegates from other organizations and agencies.



Industrial Education Project -- Rotation Sharing Pattern

(Example Only)

School Site	First Scheduled Program	Maximum of Block Time
A	2-Cyl. Small Engine Tech.	4 weeks
B	Blueprint Reading	2 weeks
C	4-Cyl. Small Engine Tech.	3 weeks
D	Arc Welding	2 weeks
E	Work Samples--Construction	2 weeks
F	Work Samples--Metals	2 weeks
G	Work Samples--Drafting	1 week
H	Marine Engine Tech.	1 week
I	Home Maintenance--Carpentry House Wiring--Plumbing	6 weeks

SCHOOL BEGIN	School A	School B	School C	School D	School E	School F	School G	School H	School I
60	2 CYL.	BLUE PRINT READING	4 CYL.	ARC WELDING	WORK SAMPLES - CONSTRUCTION	WORK SAMPLES - METALS	WORK SAMPLES - DRAFTING	MARINE ENGINE TECH.	HOME MAINTENANCE
	4 CYL.	2 CYL.	BLUE PRINT READING	CHAIN SAW	ARC WELDING	WORK SAMPLES - CONSTRUC-TION	WORK SAMPLES - METALS	WORK SAMPLES - DRAFTING	
	S.E.T. APPLI-CATIONS	4 CYL.	2 CYL.	BLUE PRINT READING	CHAIN SAW		WORK SAMPLES - CONSTRUC-TION	WORK SAMPLES - METALS	
	M.E.T.	S.E.T APPLI-CATIONS	CHAIN SAW	2 CYL.	BLUE PRINT READING	WORK SAMPLES - DRAFTING		WORK SAMPLES - CONSTRUC-TION	WORK SAMPLES - METALS
27 WEEKS TOTAL	WORK SAMPLES - DRAFTING	M.E.T.	S.E.T. APPLI-CATIONS	4 CYL.	2 CYL.	BLUE PRINT READING	CHAIN SAW		
	WORK SAMPLES - CONSTRUC-TION	WORK SAMPLES - DRAFTING	M.E.T.		4 CYL.	2 CYL.	BLUE PRINT READING	CHAIN SAW	ARC WELDING
71	WORK SAMPLES - METALS	WORK SAMPLES - CONSTRUC-TION	WORK SAMPLES - DRAFTING	M.E.T.		4 CYL.	2 CYL.	BLUE PRINT READING	
	CHAIN SAW	WORK	WORK	WORK	M.E.T.		4 CYL.	2 CYL.	

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SCIML

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	BLUE PRINT READING	CHAIN SAW	WORK SAMPLES - METALS	WORK SAMPLES - CONSTRUC- TION	WORK SAMPLES - DRAFTING	M.E.T.		4 CYL.	2 CYL.
									4 CYL.
									CHAIN SAW

END OF SCIML

In addition to those competencies listed earlier for the local teacher and outreach coordinator, the local administrator or person responsible for intradistrict coordination will play a central role to the overall project. Listed below are competencies associated with that role.

Local Administrative Competencies

-- Knowledge of vocational education philosophy
-- Knowldege of Rural Industrial Education Outreach Program
-- Assess program needs and conduct community surveys
-- Catalog incoming training modules and distribute on rotation schedule
-- Solve local problems associated with implementation of the program
-- Undertake planning with respect to storage and future facility needs
-- Coordinate vocational education curriculum on an intradistrict level
-- Share program within community and among school staff
-- Utilize available resources in the implementation of the program
-- Write proposals for funding
-- Arrange for students to attend other vocational education programs
-- Represent the program to the school community committee and board
-- Undertake local program evaluation
-- Evaluate teacher effectiveness in utilizing programmed modules
-- Interview teachers regarding vocational needs related to modules
-- Design procedures for dealing with vandalism, etc.
-- Maintain good communication with teachers, students, parents and the community at large
-- Determine the articulation of the program to graduation requirements
-- Assess the materials to be used by adult populations in the community and the related procedures necessary

8.0 EVALUATION

Procedures for evaluation will include an assessment of all instructional modules by both students and teachers. Local administrators and community representatives will be asked to assist in an overall assessment of the program at the local school and district level. The advisory committee to the center will also recommend changes/modifications in the overall program operation. In addition, center outreach personnel will be expected to compile monthly reports on the project outlining both the strengths and weaknesses as well as indicate all activities undertaken to meet the specific objectives of the project. Quarterly reports will also be expected to be filed with all cooperating school districts, the Department of Education and selected other organizations. In addition, an external evaluation is proposed for the project which will be undertaken by a team of three evaluators knowledgeable in the fields of industrial education, teacher education and vocational education in general. Assitance from other agencies in the same regional area would also expect to be drawn upon. Both formative and summartive evaluation information will be collected and included in an annual report.

9.0 RESOURCE REQUIREMENTS

Personnel

A full time Project Director will be required to serve as the primary person for the outreach center during this initial first year phase of development. The director will have overall responsibility for the management and supervision of center operations. The individual will be required to have a good working knowledge of industrial education, administrative experience and the ability to deliver in-service workshops, and conduct on-site visitations as well as assist in various aspects of local program planning. A more complete list of responsibilities is included earlier under the outreach articulation model section of this proposal. A half-time secretary will serve in a supportive capacity performing a variety of duties related to center functioning. At the local level, personnel requirements include the release time of participating teachers and coordination done by an assigned administrator or head teacher. Local districts will be expected to offer such manpower as a contribution of in-kind services to the project.

Travel

Travel for both the Project Director as well as participating teachers and administrators will be required. This travel will be undertaken for such purposes as 1) on-site field visitations, 2) in-service workshops, 3)vendor representation and 4) attendance at professional meetings throughout the State. Travel will also be provided for the external evaluation team near the end of the first year of operation.

Contractual

Transportation costs associated with transporting the equipment from the out-

reach center location to the designated local educational districts as well as software rotation expenses once the equipment is in the field is required. Costs related to computer services, office rental and telephone must also be included. A limited amount of consultant fees are also included for the external evaluation team and possible workshop instruction.

Commodities

A large proportion of the first year budget will be allocated to the purchase of industrial education instructional equipment. It is anticipated that participating school districts would contribute to these equipment costs either during the initial phase of development or at a later date when expansion and revision is anticipated. Funds will also be necessary for teacher handbooks, supplies and record keeping forms.

10. BUDGET

RURAL INDUSTRIAL EDUCATION OUTREACH PROJECT

July 1, 1979 - June 30, 1980

100	PERSONNEL		$49,916
	Project Director 1.0 FTE Range 21, Step C $2,794 X 12 mo.	$33,528	
	Project Secretary .5 FTE Range 7, Step B six months X $512	3,072	
	Step C six months X 529	3,174	
	Fringe Benefits subtotal	39,774	
	Fringe Benefits 25.5% X $39,774	10,142	
200	TRAVEL		$24,294
	Project Travel		
	Staff assessment visits to individual schools		
	2 persons X 9 schools X $250 mean air (incl. bush travel)	$ 4,500	
	Per diem 2 persons X 9 trips X 2.5 days X $65	2,925	
	Between-School Teacher Technical Assistance Trips		
	1 person X 3 schools X $150	450	
	Per diem 2 days X 3 persons X $65	390	
	Project Director Technical Assistance Trips		
	1 person X 9 schools X 2 visits X $250	4,500	
	Per diem 1 person X 18 trips X 2.5 days X $65	2,925	
	Project Director to Juneau 2 trips X $172	344	
	Per diem 2 trips X 3 days X $55	330	
	Inservice Teacher trips to Anchorage (Initial train.)		
	1 person X 9 schools X $250	2,250	
	1 person X 2 days X 9 schools X $65 per diem	1,170	
	Inservice Teacher trips to Anchorage (Second in-serv. train.)		
	1 person X 9 schools X $250	2,250	
	1 person X 2 days X 9 schools X $65 per diem	1,170	
	Other Travel: Project Director to Professional Meeting		
	Travel	500	
	Per diem 4 days X $60	240	
	Vendor Representative technical assistance	350	
300	CONTRACTUAL		$31,286
	Evaluation Team Consultants Travel		
	3 persons X 1 trip X $250	$ 750	
	Per diem 4 days X 3 persons X $65	780	
	Consulting fees $100 X 3 persons X 4 days	1,200	
	Substitute Teacher pay for Inservice Training		
	4 days X $70 X 9 schools	2,520	
	Initial Shipping of equipment to schools 9 sites X $200	1,800	

	Software rotation shipping 9 rotations X $900/rotation		$ 8,100
	Equipment repairs and maintenance services		1,400
	Other:		14,736
	Telephone	$7,615	
	Office Space	6,774	
	Copier	762	
	Computer Svc.	5,385	
	Postage	200	
400	COMMODITIES		$72,375
	Initial Equipment Layout for 3 workstations X 9 schools		
	= 27 workstations X $1,320 per workstation		$35,640
	Each workstation consists of:		
	1 Mark 9 Audio/visual unit		
	1 Console Screen w/mounting pad & plate		
	2 Headsets with Y-adaptors		
	1 steel workbench		
	1 bench enclosure/tool rack		
	2 stools		
	27 Sets of Course Equipment (3 per school X 9 schools)		
	$842 per set X 27 sets (engines & tools)		22,734
	10 Sets Instructional Courses @ $1,237.50 per course		12,375
			$70,749
	Replacement Parts for Course Equipment		700
	Office Supplies		750
	Teachers' Handbooks		100
	Student Forms, Record Keeping System		75
	TOTAL DIRECT COSTS		$177,870
	X 10% INDIRECT COSTS		17,787
	TOTAL PROJECT COSTS		$195,657

11.0 REFERENCES

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12.0 APPENDICES

A - 1 Related Vocational Education Objectives Abstracted from Vocational Education State Plan FY '78 - 82

A - 2 Projection of the State's Enrollment in Vocational Program FY '78 - 82

A - 3 Occupations Offering the Most Job Openings

A - 4 Employment Projections for Alaska 1973 - 1983

A - 5 Average Annual Employment By Occupation - Alaska

A - 6 Trades and Industry Employment Needs 1977 - 1982

A - 7 Trades and Industry Training Needs 1978 - 1982

A - 8 Student Assessment of Ken Cook Automated Teaching Systems

A - 9 Teaching Evaluation of Ken Cook Automated Teaching Systems

A - 10 How Does a Teacher Spend Time?

A - 11 Program Synopses - Ken Cook Example

A - 12 Book Lists and Book Storage Within Vendor List

A - 13 Rural Industrial Education Assessments and Interview Instruments

A - 14 Teacher Competency Pre-test

A - 15 Local Administrators Competency Pre-test

A-1

Vocational Education

Five-Year Plan*

other related objectives

Support the development and implementation of exemplary programs of vocational education (A 27.1, and I 4.2).

Establish a model for the development of a comprehensive planning system for secondary, postsecondary and adult vocational education programs. (BG 1.2)

Study the need for, feasibility of, and potential benefits to students of developing short, intensive occupational preparation programs, particularly at the secondary level; have the study completed by 1979 (A 23.1, BG 17.1).

Provide the mechanisms for supplying planned, systematic technical assistance to local practitioners in vocational education (PI 1.7).

Continue to fund and expand proven alternative delivery systems (BG 6.2).

Provide dissemination and technical assistance services to secondary, postsecondary and adult education programs. (PI 3.2)

Implement an articulation plan to improve coordination of vocational education curricula and services (BG 4.1).

Provide a planned, systematic program for the preservice training of vocational education teachers (PI 1.2).

*Source: Vocational Education State Plan ('78-82). Letters in parentheses indicate specific objective items.

Develop and implement the use of supportive services for vocational education curriculum development (PI 2.2).

Continue to develop and refine the vocational education curriculum to emphasize student's preparation for job entry or for further education for careers not requiring a baccalaureate or advanced degree (PI 2.1).

By September 30, 1979, develop a plan for exemplary horizontally and vertically articulated programs of vocational education for implementation at the local level (A10.0).

- A-2 -

PROJECTION OF THE STATE'S ENROLLMENT IN VOCATIONAL PROGRAMS FY1978 - 1982

OE Code	Occupational Programs	(Actual)* FY1976	FY1977	FY1978	FY1979	FY1980	FY1981	FY1982
01.	Agriculture	74	174	188	219	250	280	313
04.	Distribution	2,835	2,835	2,977	3,471	3,964	4,440	4,968
07.	Health	483	483	507	591	675	756	846
09.02	Occupational Home Economics	1,049	1,049	1,101	1,284	1,466	1,642	1,837
14.	Office	14,012	14,012	14,713	17,155	19,591	21,942	24,553
16.	Technical	555	555	583	679	775	868	971
17.	Trades and Industry	10,624	10,624	11,116	12,961	14,801	16,577	18,550
Level of Instruction:								
Secondary		25,474	25,474	26,748	31,188	35,617	39,891	44,638
Postsecondary		2,112	2,112	2,218	2,586	2,953	3,307	3,701
Adult								
	Preparatory	816	816	857	999	1,141	1,278	1,430
	Apprenticeship	1,332	1,332	1,399	1,469	1,678	1,879	2,103
Enrollments in Special Programs (all levels)								
	Disadvantaged	65	65	68	79	90	101	113
	Cooperative	1,267	1,267	1,330	1,551	1,771	1,983	2,219
	Work-study	66	66	69	80	91	102	114
	Depressed Areas	1,803	1,803	1,893	2,207	2,520	2,822	3,158
Enrollments of Persons with Special Needs (all levels, all programs)								
	Disadvantaged	6,924	6,924	7,270	8,477	9,681	10,843	12,133
	Handicapped	2,765	2,765	1,903	3,385	3,866	4,330	4,845

*From Alaska DOE report for FY1976 to D/HEW. Projections for FY 1978 - FY1982 are based on estimated annual percentage increases in Federal and State/Local funding. FY1977 is estimated the same as FY1976, because funding levels were about the same.

-A-3-

TOTAL GOVERNMENT - ALASKA

OCCUPATIONS OFFERING THE MOST JOB OPENINGS*

STATEWIDE

OCCUPATION	Average Annual Openings 78-82	1982 Employment
Typist/File Clerk.	246	2,617
General Clerk.	159	2,202
Secretary.	127	1,238
Police, Patrolman & Park Enf. Off.	80	1,008
Accounting Clerk	68	784
Janitor, Porters & Cleaners.	67	867
Maintenance Worker, Gen. Utility.	59	621
Heavy Equipment Operator	59	770
Fire Fighter	54	583
Civil Engineer	50	963

ANCHORAGE

Typist	199	1,872
General Clerk.	139	1,737
Secretary.	104	1,020
Postal Mail Carrier.	73	861
Air Traffic Controller	42	737
Civil Engineer	41	737

* Government 1975, Occupational Employment Statistics, Alaska Department of Labor, Research and Analysis, October, 1976

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EMPLOYMENT PROJECTIONS FOR ALASKA

Alaska Occupational Employment by Category
Over Forecast Period (1973-1983)

	# of Positions		
	1973	Projected 1983	Change 1973-83
Professional, Technical, and Kindred	23,300	44,200	20,900
Managers and Administrators, Exc. Farm	14,300	25,000	10,700
Sales Workers	6,400	12,300	5,900
Clerical and Kindred Workers	21,600	39,500	17,900
Craftsmen and Kindred Workers	18,400	31,300	12,900
Operatives, Except Transport	7,400	12,000	4,600
Transport Equipment Operatives	3,700	6,700	3,000
Laborers, Except Farm	7,200	11,800	4,600
Farm Owners, Managers and Workers	590	730	140
Service Workers, Except Private Household	15,400	31,000	15,600
Private Household Workers	1,300	3,100	1,800
TOTAL	119,590	217,630	98,040

AVERAGE ANNUAL EMPLOYMENT BY OCCUPATION
ALASKA*

OCCUPATION	1974 EMPLOYMENT	1977 EMPLOYMENT	1978 EMPLOYMENT	1985 EMPLOYMENT	AVG. ANNUAL JOB OPENINGS, 1974-85
Total all occupations	134,720	166,730	177,400	252,100	16,920
PROFESSIONAL & TECHNICAL	23,950	30,400	32,550	47,590	3,170
Engineers	2,290	3,000	3,220	4,850	280
Civil Engineers	1,160	1,555	1,685	2,590	150
Electrical Engineers	310	380	400	575	30
Life & Physical Scientists	1,140	1,300	1,340	1,710	75
Geologists	450	500	520	640	20
Engineering, Science Tech.	2,450	3,160	3,400	5,035	300
Drafters	600	930	1,050	1,840	150
Elec., Electronic Tech.	980	1,020	1,030	1,110	20
Surveyors	350	500	550	900	50
Med. Workers, exc. Tech.	1,840	2,520	2,750	4,340	360
Phys., MD Osteopaths	350	470	510	800	50
Registered Nurses	1,075	1,480	1,625	2,580	240
Hlth. Technologists & Tech	490	720	800	1,350	130
Tech., exc. health	2,110	2,660	2,840	4,120	230
Air Traffic Controllers	650	655	659	745	20
Computer Specialists	370	530	585	960	60
Writers, Arts., Entertainers	1,460	1,750	1,840	2,500	165
All other Prof. & Tech.	11,800	14,760	15,775	22,725	1,570
Accountants	1,500	1,800	1,900	2,620	180
Architects	340	450	490	750	40
Clergy	450	460	460	475	13
Judges	55	64	66	100	20
Lawyers	565	830	920	1,530	100
Librarians	265	340	370	550	50
Personnel Labor Rel.	730	955	1,080	1,550	100
Social Workers	560	740	800	1,220	90
Voc. Ed. Counselors	290	450	500	880	80
MANAGERS & OFFICERS	19,550	23,790	25,200	35,090	2,080
Buyers, Sales, Loan Manager	2,880	3,675	3,940	5,800	370
Bank, Financial Man.	930	1,125	1,190	1,655	100
Sales Man., Retail Trade	660	860	930	1,400	90
Sales Man., exc. Ret. Trd.	250	315	340	500	30
Administrators & Pub. Insp.	4,000	4,800	4,980	7,240	370
Health Admin.	360	440	460	650	40
Pub. Insp., Const.	95	118	121	190	10
Pub. Insp., exc. Const.	337	372	382	424	25
Pub. Off. & Admin.	2,794	3,307	3,441	5,080	280
Postmaster & Mail Super.	220	210	205	180	1
All Other Managers	12,670	15,315	16,280	22,050	1,340
Railroad Conductors	48	48	50	50	1
Rest., Cafe & Bar Man.	830	1,020	1,090	1,530	110
Bldg. Manager & Super.	225	280	300	440	30
Ship Off, Pilots or Pursers	410	540	580	875	60

*Source: Alaska Department of Labor, Alaska Annual Planning Report, Research and Analysis section, June 1976.

OCCUPATION	1974 EMPLOYMENT	1977 EMPLOYMENT	1978 EMPLOYMENT	1985 EMPLOYMENT	AVG. ANNUAL JOB OPENINGS, 1974-85
SALES	6,070	7,500	7,970	11,300	820
Ins. Agents, Brokers, etc.	330	385	400	535	30
Real Est. Agt, Brkrs, etc.	515	570	590	720	40
Stock and Bond Sales Agents	200	300	340	600	50
CLERICAL	23,370	30,280	32,580	48,700	4,280
Sten., Typists & Sec.	7,240	9,825	10,680	16,710	1,645
Legal Sec.	360	600	675	1,220	140
Medical Sec.	110	150	170	260	30
Stenographers	160	170	170	180	10
Typists	1,830	2,450	2,650	4,100	410
Office Machine Operators	555	655	680	900	75
Comp., Peripheral Equip.	190	245	265	400	32
Keypunch Operators	220	240	245	290	25
Other Clerical Workers	15,580	19,800	21,215	31,080	2,555
Bank Tellers	540	620	650	850	90
Billing Clerks	270	345	370	555	55
Bookkeepers	3,020	3,600	3,800	5,150	400
Cashiers	1,530	1,910	2,040	2,930	255
Clerical Superv., nec.	420	480	500	640	30
Collectors, Bill & Acct.	165	210	225	330	35
Counter Clks, exc. Food	580	715	760	1,070	95
Dispatcher, Starter, Vehc	185	260	290	470	40
Expeditors, Prod Contro.	270	330	350	485	30
File Clerks	300	370	390	530	45
Ins. Adj., Examiners	85	100	110	145	10
Lib. Attendants, Asst.	150	200	215	330	35
Mail Carriers, P.O.	600	770	774	780	41
Mail Handler, exc P.O.	200	260	280	430	40
Payroll, Timekeeping Clk	300	400	440	680	60
Postal Clerks	347	347	349	352	17
Receptionists	670	890	970	1,500	155
Shipping, Rec. Clks	245	330	360	560	40
Statistical Clerks	420	570	620	970	75
Stock Clks, Storekeepers	950	1,160	1,230	1,730	115
Telephone Operators	630	730	760	980	90
CRAFTS, OPERATIVES, LABORERS	43,190	50,500	52,930	70,000	3,450
Construction Crafts	11,600	13,520	14,150	18,610	935
Carpenters & Apprentices	3,020	3,300	3,400	4,050	180
Brick & Stnmasons & App	80	85	85	90	2
Bulldozer Operators	675	875	945	1,400	100
Cement & Concrete Fin.	60	65	65	75	1
Elec. & Apprentices	1,045	1,150	1,180	1,430	55
Excav, Grad, Mach Oper.	2,180	2,880	3,110	4,735	280
Painters & Apprentices	550	580	590	660	30
Roofer and Slaters	90	95	100	120	3
Structural Metalcrft Wkr	365	400	410	490	20

OCCUPATION	1974 EMPLOYMENT	1977 EMPLOYMENT	1978 EMPLOYMENT	1985 EMPLOYMENT	AVG. ANNUAL JOB OPENINGS, 1974-85
Metal Wrkg Craft Wkrs	615	760	815	1,160	70
Machinists & App.	230	300	325	490	30
Millwrights	240	300	315	450	25
Mech, Repairers & Installers	5,960	7,420	7,900	11,320	620
A/C, Heating, Refrig Mech	315	440	480	775	60
Auto Body Repairers	250	280	290	360	15
Auto Mech & App	1,615	2,040	2,180	3,190	180
Hvy Equip Mech, inc Diesel	1,945	2,320	2,445	3,325	170
Household Appl Mech	175	215	230	325	16
Office Mach Repairers	90	130	150	250	17
Radio, TV Repairers	335	430	460	680	35
Printing Trade Craft Wkrs	140	160	165	200	11
Trans, Public Utilities	1,225	1,430	1,500	1,970	80
Elect Pwrline Inst. & Rep	280	320	330	415	15
Locomotive Engineers	35	35	35	36	1
Power Station Oper	160	165	170	180	4
Tele Installers, Repair	590	725	770	1,080	50
Tele Line Instal, Splicers	165	185	190	240	10
Other Crafts, Kindred Wkrs.	2,030	2,375	2,490	3,300	160
Bakers	230	260	270	340	20
Cabinet Makers	55	60	65	80	5
Carpet Installers	100	120	125	170	7
Crane, Derrick & Hoist Op	340	420	450	635	30
Dental Laboratory Tech	55	55	55	58	3
Stationary Engineers	490	530	540	630	20
Operatives	12,725	14,650	15,290	19,780	960
Semiskilled Metalwkg	745	870	900	1,190	50
Welders & Flamecutters	735	855	895	1,170	50
Other Operatives	7,800	8,560	8,825	10,600	475
Assemblers	75	100	110	170	12
Bottling, Canning Op	840	880	890	980	50
Clthng Ironers & Press.	90	85	80	70	2
Drillers, Earth	470	500	510	585	15
Dry Wall Instl, Lathes	250	250	255	265	10
Gar Wkrs, Gas Sta Att	525	620	655	880	40
Lndry, Dry Clning Op nec	410	470	490	630	40
Meat Cut, Butch, exc Mfg	260	300	325	440	20
Meat Cutters, Butchers	240	245	245	260	5
Mixing Operatives	60	65	65	70	1
Oil, Greasers, exc auto	220	230	240	260	10
Photo Proc Workers	75	100	110	170	15
Sailors & Deckhands	340	440	470	700	40
Sawyers	44	48	50	62	3
Transport Equip Oper	4,180	5,220	5,565	7,990	435
Bus Drivers	550	788	866	1,420	100
Delvry & Rt Workers	910	1,130	1,200	1,720	90
Fork Lift, Tow Mtr Oper	355	415	435	580	30
Railroad Brake Oper	55	60	60	75	2
Taxicab Dr, Chauffeurs	375	500	540	830	60
Truck Drivers	1,875	2,265	2,395	3,305	150

OCCUPATION	1974 EMPLOYMENT	1977 EMPLOYMENT	1978 EMPLOYMENT	1985 EMPLOYMENT	78 AVG. ANNUAL JOB OPENINGS, 1974-85
Laborers, exc Farm	8,900	10,190	10,620	13,640	610
Animal Caretakers	400	570	630	1,030	90
Carpenters Helpers	170	300	330	545	25
Const Labor, exc Carp Help	2,100	2,340	2,420	3,000	120
Frght, Material Handlers	1,040	1,225	1,285	1,710	75
Garbage Collectors	130	175	190	300	20
Gardeners, Groundkeepers	270	340	360	530	30
Longshr Wkrs, Stevedores	300	425	470	770	50
SERVICE	18,225	23,930	25,830	39,140	3,120
Cleaning Serv Workers	4,340	5,800	6,300	9,700	760
Janitors & Sextons	2,850	3,680	3,960	5,890	420
Food Service Workers	6,810	8,860	9,545	14,330	1,150
Bartenders	890	1,140	1,225	1,820	120
Cooks	2,130	2,815	3,040	4,630	370
Dishwashers	375	460	490	690	40
Food Cnter, Fountain Wkr	515	690	750	1,160	100
Waiters	2,000	2,620	2,830	4,275	400
Health Service Workers	1,470	2,330	2,615	4,620	460
Dental Assistants	150	220	240	400	40
Nurses Aides, Orderlies	675	1,070	1,200	2,120	200
Practical Nurses	510	840	950	1,730	190
Personal Service Workers	2,330	2,980	3,200	4,700	400
Child Care Wkr, exc Priv	880	1,300	1,456	2,440	240
Housekeepers	300	340	360	480	30
Protective & Service Workers	2,190	2,940	3,180	4,900	310
Firefighters	600	770	830	1,230	65
Guards	745	890	940	1,280	85
Police & Detectives	840	1,260	1,400	2,380	160

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Trades and Industry
Employment Needs*
1977 - 1982

	EMPLOYMENT NEEDS		PERSONS AVAILABLE FOR EMPLOYMENT				
	EMPLOYMENT 1977	EMPLOYMENT 1982	SEC. 1982	POST SEC. 1982	ADULT 1982	TOTAL 1982	TRAINING SURPLUS+ AND TRAINING DEFICIT-
000 TOTAL - TRADES AND INDUSTRY	42,027	6,826	2,184	93	1,148	3,425	-3,401
[illegible] Air Conditioning							
1200 Appliance Repair							-
001 Body and Fender Repair	180	89					-89
002 Auto Mechanics	1,856	518	331	6	65	402	-116
999 Other Automotive							
003 Aviation Occupations	725	190	27	2	107	136	-54
000 Blueprint Reading	473	187	4	4		8	-179
030 Business Machine Maintenance							
700 Commercial Art Occupation	125	34					-34
00 Commercial Fishery Occupations	3,360	165	76	14		90	-75
00 Commercial Photography Occupations	83	20					-20
001 Carpentry	2,399	306	34		136	170	-136
002 Electricity	278	35	29	3	1	33	-2
[illegible] Masonry					55	55	+55
007 Machine and Pipefitting	954	287	10	2	108	120	-167
[illegible] Other Construction and Maintenance Trades	5,674	586	99		67	166	-420
001 Custodial Service	4,490	573		3	25	28	-545
00 Diesel Mechanic			5	16	69	90	+90
000 Drafting Occupations	483	144	205	8		213	+69
002 Electrical Occupations	713	228	101	12	76	189	-39
00 Electronic Occupations	1,039	119	29	15		44	-75
00 Farm Maintenance Services	433	32					-32
00 Foremanship Supervisor & Mgmt. Development							
00 Graphic Arts Occupations	400	80	71			71	-9
00 Industrial Atomic Energy Occupations							
00 Instrument Maint. and Repair Occupations							
000 Maritime Occupations							
00 Machine Shop							
00 Machine Tool Operation							
00 Sheet Metal	902	61			77	77	+16
00 Welding and Cutting	190	16	300	8	174	482	+466
00 Tool and Die Making							
00 Other Metal Working Occupations			71			71	+71
000 Metallurgy Occupations							
00 Nursing							
00 Cosmetology	625	262	22		45	67	-195
00 Other Personal Services							
000 Plastics Occupations							
001 Fireman Training	710	127					-127
002 Law Enforcement Training	1,170	318					-318
999 Other Public Services							
000 Quantity Food Occupations	6,573	924					-924
00 Refrigeration	146	62					-62
00 Small Engine Repair	1,852	523	439			439	-84
000 Stationary Energy Sources Occupations	653	44					-44
00 Textile Production and Fabrication							
00 Leather Working							
00 Upholstering							
00 Woodworking Occupations	2,551	68	331			331	+263
00 Other* Heavy Equipment Operator	2,990	828			143	143	-685

*Source: Vocational Education State Plan (1978-1982)

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Trades and Industry Training Needs*

	TRAINING GOALS TO MEET NEEDS				FUNDING TO MEET EMPLOYMENT NEEDS					
					SECONDARY		POST-SECONDARY		ADULT	
	SEC. 1978	POST-SEC. 1978	ADULT 1978	TOTAL 1978	FEDERAL 1978	STATE & LOCAL 1978	FEDERAL 1978	STATE & LOCAL 1978	FEDERAL 1978	STATE & LOCAL 1978
TOTAL - TRADES AND INDUSTRY	8,133	137	2,991	11,261	100,000	3,138,583	40,000	159,180	7,900	1084028
Air Conditioning										7,249
Appliance Repair										
Body and Fender Repair	136		20	156		52,485				
Auto Mechanics	1,239	21	120	1,380		478,155		24,400		43,492
Other Automotive			17	17						6,161
Aviation Occupations	96		93	189		37,048				33,706
Blueprint Reading	17			17		6,561				
Business Machine Maintenance										
Commercial Art Occupation	39			39		15,050				
Commercial Fishery Occupations	85		642	727	7,000	32,803	10,000			232,680
Commercial Photography Occupations	519	10		529		200,292		11,619		
Carpentry	442	17	70	529	7,000	170,577		19,752		25,370
Electricity	100	15	13	128	4,000	38,592		17,429		4,712
Masonry			13	13						4,712
Plumbing and Pipefitting			77	77	3,000					27,907
Other Construction and Maintenance Trades	299	15	129	443	39,000	115,390	30,000	17,428	7,900	46,753
Custodial Service	11			11	5,000	4,245				
Diesel Mechanic			51	51						18,484
Drafting Occupations	1,041	21	59	1,121		401,743		24,400		21,383
Electrical Occupations	156		199	355		50,204				72,124
Electronic Occupations	458		8	466		170,751				2,899
Fabric Maintenance Services										
Foremanship Supervisor & Mgmt. Development										
Graphic Arts Occupations	256			256		98,796				
Industrial Atomic Energy Occupations										69,585
Instrument Maint. and Repair Occupations										
Maritime Occupations			192	192						
Machine Shop										
Machine Tool Operation										78,285
Sheet Metal			216	216	15,000					140,623
Welding and Cutting			388	388						
Tool and Die Making										
Other Metalworking Occupations	922	17	112	1,051		355,818		19,752		40,592
Metallurgy Occupations										
Barbering										
Cosmetology										
Other Personal Services										
Plastics Occupations										

*Source: Vocational Education State Plan (1978-1982)

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	TRAINING GOALS TO MEET NEEDS				FUNDING TO MEET EMPLOYMENT NEEDS					
					SECONDARY		POST-SECONDARY		ADULT	
	SEC.	POST-SEC.	ADULT	TOTAL	FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL
	1978	1978	1978	1978	1978	1978	1978	1978	1978	1978
Fireman Training			22	22						7973
Law Enforcement Training										
Other Public Services										
Quantity Food Occupations										
Refrigeration										
Small Engine Repair	868		50	918	20,000	334,979		24,400		18122
Stationary Energy Sources Occupations		21		21						
Textile Production and Fabrication										
Leather Working										
Upholstering										
Woodworking Occupations	1,449		41	1,490						14,860
Other* Heavy Equipment Operation			459	459		559,094				166355

	TRAINING GOALS TO MEET NEEDS				FUNDING TO MEET EMPLOYMENT NEEDS					
					SECONDARY		POST-SECONDARY		ADULT	
	SEC. 1979	POST-SEC. 1979	ADULT 1979	TOTAL 1979	FEDERAL 1979	STATE & LOCAL 1979	FEDERAL 1979	STATE & LOCAL 1979	FEDERAL 1979	STATE & LOCAL 1979
TOTAL - TRADES AND INDUSTRY	8,621	145	3,167	11,933	109,500	3,327,016	32,750	167,698	7,250	1141925
Air Conditioning										
Appliance Repair										
Body and Fender Repair	144		21	165		55,572				7,572
Auto Mechanics	1,314	22	127	1,463		507,098		25,458		45,792
Other Automotive			18	18						6,490
Aviation Occupations	102		99	201		39,364				35,696
Blueprint Reading	18			18		6,947				
Business Machine Maintenance										
Commercial Art Occupation	41			41		15,823				
Commercial Fishery Occupations	89		682	771	6,000	34,347	10,750			245909
Commercial Photography Occupations	550	11		561		212,256		12,729		
Carpentry	469	18	74	561	8,000	180,996		20,829		26,682
Electricity	106	16	14	136	10,000	40,908		18,515		5,048
Masonry			14	14						5,048
Plumbing and Pipefitting			83	83	5,000					29,927
Other Construction and Maintenance Trades	318	16	129	463	45,000	122,723	22,000	18,422	7,250	46,514
Custodial Service	12			12	5,000	4,631				
Diesel Mechanic			55	55	10,000					19,831
Drafting Occupations	1,103	22	63	1,188		425,670		25,458		22,716
Electrical Occupations	165		212	377		63,677				76,441
Electronic Occupations	486		9	495		187,557				3,245
Fabric Maintenance Services										
Foremanship Supervisor & Mgmt. Development										
Graphic Arts Occupations	271			271		104,584				
Industrial Atomic Energy Occupations										
Instrument Maint. and Repair Occupations										
Maritime Occupations			204	204						73,556
Machine Shop										
Machine Tool Operation			229	229						82,571
Sheet Metal			405	405						146031
Welding and Cutting										
Tool and Die Making	976	18	120	1,114		376,658		20,829		43,268
Other Metalworking Occupations										
Metallurgy Occupations										
Barbering										
Cosmetology										
Other Personal Services										
Plastics Occupations										

	TRAINING GOALS TO MEET NEEDS				FUNDING TO MEET EMPLOYMENT NEEDS					
	SEC.	POST-SEC.	ADULT	TOTAL	SECONDARY		POST-SECONDARY		ADULT	
					FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL
	1979	1979	1979	1979	1979	1979	1979	1979	1979	1979
Fireman Training			24	24						8,654
Law Enforcement Training										
Other Public Services										
Quantity Food Occupations										
Refrigeration										
Small Engine Repair	920		54	974	20,500	355,046				19,471
Stationary Energy Sources Occupations		22		22				25,458		
Textile Production and Fabrication										
Leather Working										
Upholstering										
Woodworking Occupations	1,537		44	1,581		593,159				15,865
Other* Heavy Equipment Operation			487	487						175598

	TRAINING GOALS TO MEET NEEDS				FUNDING TO MEET EMPLOYMENT NEEDS					
	SEC.	POST-SEC.	ADULT	TOTAL	SECONDARY		POST-SECONDARY		ADULT	
					FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL
	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980
TOTAL - TRADES AND INDUSTRY	9,138	154	3,357	12,649	115,900	3399336	31,950	177,408	7,650	1204792
Air Conditioning										
Appliance Repair										
Body and Fender Repair	153		22	175		56,916				7,896
Auto Mechanics	1,393	24	135	1,552		518,196		27,648		48,450
Other Automotive			19	19						6,819
Aviation Occupations	108		105	213		40,176				37,683
Blueprint Reading	19			19		7,068				
Business Machine Maintenance										
Commercial Art Occupation	44			44		16,368				
Commercial Fishery Occupations	94		723	817	5,000	34,968	4,950			259477
Commercial Photography Occupations	583	11		594		216,876		12,672		
Carpentry	497	19	78	594	9,000	184,884		21,888		27,993
Electricity	112	17	15	144	11,000	41,664		19,584		5,383
Masonry			15	15						5,383
Plumbing and Pipefitting			88	88	4,000					31,582
Other Construction and Maintenance Trades	337	17	137	491	50,000	125,364	22,000	19,584	7,650	49,168
Custodial Service	13			13	4,000	4,836				
Diesel Mechanic			58	58	12,900					20,816
Drafting Occupations	1,169	24	67	1,260		434,868		27,648		24,046
Electrical Occupations	175		225	400		65,100				80,750
Electronic Occupations	515		10	525		191,580				3,589
Fabric Maintenance Services										
Foremanship Supervisor & Mgmt. Development										
Graphic Arts Occupations	287			287		106,764				
Industrial Atomic Energy Occupations										
Instrument Maint. and Repair Occupations										
Maritime Occupations			216	216						77,520
Machine Shop										
Machine Tool Operation										
Sheet Metal			243	243						87,210
Welding and Cutting			429	429						153964
Tool and Die Making										
Other Metalworking Occupations	1,035	19	127	1,181		385,020	5,000	21,888		45,579
Metallurgy Occupations										
Barbering										
Cosmetology										
Other Personal Services										
Plastics Occupations										

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	TRAINING GOALS TO MEET NEEDS				FUNDING TO MEET EMPLOYMENT NEEDS					
	SEC.	POST-SEC.	ADULT	TOTAL	SECONDARY		POST-SECONDARY		ADULT	
					FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL
	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980
Fireman Training			25	25						8,972
Law Enforcement Training										
Other Public Services										
Quantity Food Occupations										
Refrigeration										
Small Engine Repair	975		57	1,032	20,000	362,700				20,457
Stationary Energy Sources Occupations		23		23				26,496		
Textile Production and Fabrication										
Leather Working										
Upholstering										
Woodworking Occupations	1,629		47	1,676		605,988				16,868
Other* Heavy Equipment Operation			516	516						185187

	TRAINING GOALS TO MEET NEEDS				FUNDING TO MEET EMPLOYMENT NEEDS					
	SEC.	POST-SEC.	ADULT	TOTAL	SECONDARY		POST-SECONDARY		ADULT	
					FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL
	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980
Fireman Training			25	25						8,972
Law Enforcement Training										
Other Public Services										
Quantity Food Occupations										
Refrigeration										
Small Engine Repair	975		57	1,032	20,000	362,700				20,457
Stationary Energy Sources Occupations		23		23				26,496		
Textile Production and Fabrication										
Leather Working										
Upholstering										
Woodworking Occupations	1,629		47	1,676		605,988				16,868
Other* Heavy Equipment Operation			516	516						185187

	TRAINING GOALS TO MEET NEEDS				FUNDING TO MEET EMPLOYMENT NEEDS					
	SEC.	POST-SEC.	ADULT	TOTAL	SECONDARY		POST-SECONDARY		ADULT	
					FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL
	1981	1981	1981	1981	1981	1981	1981	1981	1981	1981
TOTAL - TRADES AND INDUSTRY	9,686	163	3,558	13,407	116,000	3536958	51,000	187,327	13,450	1270532
Air Conditioning										
Appliance Repair										
Body and Fender Repair	162		23	185		59,156				8,213
Auto Mechanics	1,477	25	143	1,645		539,342		28,731		51,068
Other Automotive			20	20						7,142
Aviation Occupations	114		111	225		41,628				39,640
Blueprint Reading	20			20		7,303				
Business Machine Maintenance										
Commercial Art Occupation	47			47		17,163				
Commercial Fishery Occupations	100		766	866	5,000	36,516	4,000			273,563
Commercial Photography Occupations	617	12		629		225,304		13,791		
Carpentry	527	20	83	630	10,000	192,439		22,985		29,640
Electricity	118	18	16	152	8,000	43,089		20,686		5,713
Masonry			16	16						5,713
Plumbing and Pipefitting			93	93						33,212
Other Construction and Maintenance Trades	358	19	145	522	48,000	130,727	34,000	21,836	13,450	51,782
Custodial Service	14			14	4,000	5,112				
Diesel Mechanic			61	61	14,000		5,000			21,784
Drafting Occupations	1,238	25	71	1,334		452,086		28,731		25,355
Electrical Occupations	186		238	424		67,920				84,994
Electronic Occupations	546		11	557		199,377	4,000			3,928
Fabric Maintenance Services										
Foremanship Supervisor & Mgmt. Development										
Graphic Arts Occupations	304			304		111,009				
Industrial Atomic Energy Occupations										
Instrument Maint. and Repair Occupations			229	229						81,780
Maritime Occupations										
Machine Shop										
Machine Tool Operation										
Sheet Metal			258	258						92,136
Welding and Cutting			455	455						162,489
Tool and Die Making										
Other Metalworking Occupations	1,097	20	135	1,252		400,581	4,000	22,985		48,211
Metallurgy Occupations										
Barbering										
Cosmetology										
Other Personal Services										
Plastics Occupations										

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	TRAINING GOALS TO MEET NEEDS				FUNDING TO MEET EMPLOYMENT NEEDS					
					SECONDARY		POST-SECONDARY		ADULT	
	SEC. 1981	POST-SEC. 1981	ADULT 1981	TOTAL 1981	FEDERAL 1981	STATE & LOCAL 1981	FEDERAL 1981	STATE & LOCAL 1981	FEDERAL 1981	STATE & LOCAL 1981
Fireman Training			27	27						9,642
Law Enforcement Training										
Other Public Services										
Quantity Food Occupations										21,427
Refrigeration			60	1,094	27,000	377,575		27,582		
Small Engine Repair	1,034									
Stationary Energy Sources Occupations		24		24						
Textile Production and Fabrication										
Leather Working										17,856
Upholstering										195,344
Woodworking Occupations	1,727		50	1,777		630,631				
Other*Heavy Equipment Operation			547	547						

	TRAINING GOALS TO MEET NEEDS				FUNDING TO MEET EMPLOYMENT NEEDS					
	SEC.	POST-SEC.	ADULT	TOTAL	SECONDARY		POST-SECONDARY		ADULT	
					FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL
	1982	1982	1982	1982	1982	1982	1982	1982	1982	1982
TOTAL - TRADES AND INDUSTRY	10,267	173	3,771	14,211	112,800	3680720	50,400	198,237	13,800	1340364
Air Conditioning										
Appliance Repair										
Body and Fender Repair	172		24	196		61,662				8,531
Auto Mechanics	1,566	27	150	1,743		561,411		30939		53,316
Other Automotive			21	21						7,464
Aviation Occupations	120		118	238		43,379				41,942
Blueprint Reading	21			21		7,529				
Business Machine Maintenance										
Commercial Art Occupation	50			50		17,925				
Commercial Fishery Occupations	106		812	918	5,000	38,001	4,000			288617
Commercial Photography Occupations	655	13		668		234,818		14,896		
Carpentry	559	21	88	668	8,000	200,402		24,063		31,279
Electricity	125	19	17	161	6,000	44,813		21,772		6,042
Masonry			17	17						6,042
Plumbing and Pipefitting			99	99						35,189
Other Construction and Maintenance Trades	379	20	155	554	52,000	135,872	35,000	22,918	13,800	55,093
Custodial Service	15			15	6,000	5,378				
Diesel Mechanic			65	65	10,000		3,000			23,104
Drafting Occupations	1,312	27	75	1,414		470,352		30,939		26,658
Electrical Occupations	198		252	450		70,625				89,571
Electronic Occupations	579		12	591		207,572				4,265
Fabric Maintenance Services										
Foremanship Supervisor & Mgmt. Development										
Graphic Arts Occupations	322			322		115,432				
Industrial Atomic Energy Occupations										
Instrument Maint. and Repair Occupations										
Maritime Occupations			243	243						86,372
Machine Shop										
Machine Tool Operation										
Sheet Metal			273	273						97,015
Welding and Cutting			482	482						171322
Tool and Die Making										
Other Metalworking Occupations	1,163	21	144	1,328		416,936	8,400	24,063		51,183
Metallurgy Occupations										
Barbering										
Cosmetology										
Other Personal Services										
Plastics Occupations										

	TRAINING GOALS TO MEET NEEDS				FUNDING TO MEET EMPLOYMENT NEEDS					
	SEC.	POST-SEC.	ADULT	TOTAL	SECONDARY		POST-SECONDARY		ADULT	
					FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL	FEDERAL	STATE & LOCAL
	1982	1982	1982	1982	1982	1982	1982	1982	1982	1982
Fireman Training			28	28						9,952
Law Enforcement Training										
Other Public Services										
Quantity Food Occupations										
Refrigeration										
Small Engine Repair	1,096		63	1,159	25,800	392,916				22,393
Stationary Energy Sources Occupations		25		25				28,647		
Textile Production and Fabrication										
Leather Working										
Upholstering										
Woodworking Occupations	1,829		53	1,882		655,697				18,838
Other"Heavy Equipment Operation			580	580						206156

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STUDENT ASSESSMENT OF
KEN COOK AUTOMATED TEACHING SYSTEMS*

Legend: 1 - Did not teach these
2 - Taught these poorly
3 - Taught these well
4 - Taught these very well

AVERAGE SCORES

1 2 3 4	How to disassemble, inspect and assemble an engine.
1 2 3 4	How and why a small engine operates.
1 2 3 4	How to maintain and care for a small engine.
1 2 3 4	The correct names of the parts and components of a small engine.
1 2 3 4	How to recognize worn or faulty engine parts.
1 2 3 4	How to make a compression check.
1 2 3 4	How to make an ignition check.
1 2 3 4	How to repair small engines.
1 2 3 4	How to follow directions.
1 2 3 4	How to use manuals and parts catalogues.
1 2 3 4	Why arithmetic is necessary for mechanics.
1 2 3 4	Why it is necessary to do mechanical things in proper sequence.
1 2 3 4	Why neatness is important when handling small mechanical parts.
1 2 3 4	How to keep parts from getting mixed up or lost.
1 2 3 4	How to take proper care of tools and equipment.
1 2 3 4	Proper clean-up procedures.
1 2 3 4	How to complete a job in the time allowed.
1 2 3 4	How to work with others.
1 2 3 4	Why it is important to pay attention to details.

1 2 3/4 Proper use of hand tools.

Legend: 1 - Low
2 -
3 -
4 -
5 - High

1 2 3 4/5 I like this method of instruction.

1 2 3/4 5 The subject matter is presented in an interesting way.

1 2 3 4/5 It is easy to learn using this sytem of instruction.

1 2 3 4/5 I would like to take additional Ken Cook courses (small engines).

1 2 3 4/5 I would like to take other courses (besides small engine) using the Ken Cook System.

1 2/3 4 5 The Ken Cook Program moved too fast.

1 2\3 4 5 The Ken Cook Program moved too slow.

List below three (or more) things you like about the Ken Cook Systems.

It was very easy for me to understand . . . Went into detail . . . Learn more than from a teacher . . . Learn more this way . . . Good way to learn . . . Taught proper use of tool, neatness, proper care of engines . . . . Covers subject well . . . Can go at my own speed . . . Explains as you do work (liked the pictures, shows you as well as tells you).

List below three (or more) things you did not like. Why?

Questions should be harder . . . Moved too slow in some areas . . . I liked it . . . Some things covered too much . . . If you miss what was said on tape you can't go back . . . Can't think of any.

Remarks:

Better than I anticipated . . . Liked it very much . . . Real good for beginning mechanics . . . All right!! . . . An Educational course . . . Generally good . . . like it! . . . A good way to teach . . . Everyone should be able to take this class.

*Source: Hillway, B. W. Regional Sharing Concepts For Small Engine Technology in Coos County, Oregon. 1974-75, Coos County Intermediate Education District, no date.

THE TEACHING EVALUATION OF

KEN COOK AUTOMATED TEACHING SYSTEMS*

Legend: 1 - low
2 -
3 -
4 - high

Does it do what it was designed to do?

The Ken Cook Small Engine Technician Course was designed to provide an understanding of small engine technology by exposing the student to basic principles and factory approved disassembly, inspection and assembly practices. The basic objectives, as outlined by the Ken Cook Co., are:

1 2 3 4	Provide students with basic knowledge and entry-level skills in industrial mechanics.
1 2 3 4	Acquaint students with systems as they apply to various aspects of power mechanics, e.g.; electrical, mechanical, carburetion.
1 2 3 4	Instruct students in diagnostic techniques and procedures.
1 2 3 4	Familiarize the student with the use and the importance of related parts manuals, operator manuals, wiring diagrams, and other printed matter used by a service technician.
1 2 3 4	Acquaint students with industrial work procedures, e.g., assembly-disassembly, repair, testing, use of specifications, and techniques of communication.
1 2 3 4	Instruct students in the application and use of hand tools, special tools, measuring and test equipment.
1 2 3 4	Give students background in safety practices.

What does it do that we didn't expect it to do?

In addition to the objectives, as set down by Ken Cook Transnational, the system offers additional benefits: (i.e. Does it improve study habits, work habits, attitudes?)

1 2 3 4	Increases the ability to follow directions by improving listening skills.
1 2 3 4	Increases the ability to follow directions by improving the ability to see and understand what one is looking at.
1 2 3 4	Increases manipulative skills through a learning by doing - hands-on approach.
1 2 3 4	Improves spelling and the vocabulary through the use of worksheets, nomenclature and the language of the trade.

1 2 3 4	Encourages related-study research through the use of manuals, parts catalogs and the development of the workbook.
1 2 3 4	Emphasizes the importance of arithmetic and communications by making them relevant to the small engines technician.
1 2 3 4	Teaches orderliness through a systematic approach (a one-step-at-a-time orderly progression to avoid omissions).
1 2 3 4	Encourages neatness to avoid loss or misplacement of parts.
1 2 3 4	Teaches care of tools, parts, equipment.
1 2 3 4	Teaches clean-up procedures.
1 2 3 4	Creates a sense of timing by emphasizing the need to complete a given job within a reasonable time span.
1 2 3 4	Encourages the student to check his work by utilizing compression checks, ignition checks, etc.
1 2 3 4	Generates a strong student interest.
1 2 3 4	Encourages teamwork and the acceptance of fellow workers.
1 2 3 4	Generates pride in workmanship.
1 2 3 4	Emphasizes attention to details.
1 2 3 4	Utilizes peer-group teaching.

List four things you like about the Program: Hands on entry level anyone anywhere, high interest, highly motivational, keeps students busy, tests good, student can progress at own speed, student assumes active role in class, frees instructor to help slower individuals, pride in accomplishment, excellent basic 2 & 4 cycle, teaches orderly progression, takes one step at a time, builds self-confidence through success factor.

List four things you do not like about the Program: Repetition, tape rewind, scheduling problems, head phones, tests not too good, program flexibility difficult, audio does not repeat.

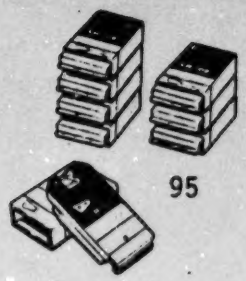
*Source: Hillway, B. W. Regional Sharing Concepts For Small Engine Technology in Coos County, Oregon. 1974-75, Coos County Intermediate Education District, no date.

A-10

HOW DOES A TEACHER SPEND TIME?

In A Traditional Shop		In A Student-Managed Learning Shop
10.7	Student Guidance (Guide student to solution of problem, to references, and discuss ideas with him.)	48.3
5.0	Performance Evaluation (Discuss with student his feelings about his work, talents, abilities, future.)	33.3
35.7	Dissemination of Information (Lecturing, demonstrating, testing, answering questions, giving assignments.)	6.7
29.4	Managing Materials (Punching shop cards, selling and dispensing materials, keeping records, collecting fees, ect.)	11.7
12.2	Performance Measuring (Grading projects and/or testing, entering grades in grade book.)	0
7.2	Checking Attendance (Calling roll, entering attendance in book.)	0
100.0		100.0

*Source: Rural Industrial Education Project Manual



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PROGRAM SYNOPSES

UNIT ! - TWO CYCLE

Carburetor - Disassembly – SET-U1WS-B01

This program familiarizes the student with a typical two cycle carburetor, its component parts, their functions and appearances. During carburetor removal and disassembly, the student learns carburetor float and primer functions.

Carburetor - Inspection – SET-U1WS-A02

The student identifies carburetor component parts and learns inspection checks, then lists them on a worksheet. Physical checks are performed on the carburetor with emphasis placed on how to perform the various inspections and the types of defects to look for. Carburetion theory is emphasized through a study of fuel flow.

Carburetor - Assembly – SET-U1WS-B03

Carburetor components and reassembly tools are presented again. The student is shown special handling methods to avoid damaging fragile components. Proper care and procedures for reinstallation of parts is stressed. Final installation closely covers positioning of governor control rod and needle valve adjustment.

Magneto - Disassembly – SET-U1WS-A04

The student immediately begins disassembly after being cautioned to disconnect the hi-tension lead. Proper positioning of the engine on its mounting stand is covered. The use of special tools is included in reaching the magneto. Time is devoted to the operation of the governor and carburetor as related to the magneto components. Cleanliness is stressed with the removal of the magneto components and each component is readily identified.

Magneto - Inspection – SET-U1WS-A05

This program technically breaks down the two cycle ignition into understandable sub-units. The governor, magneto, and spark advance components are illustrated in worksheet form for student identification. Each component's function is explained and inspection instructions are noted on the worksheet. The student relates the actual magneto components to the explanation of magneto theory which is broken into spark production, control and use.

Magneto - Assembly – SET-U1WS-B06

Reassembly components are reviewed. The student learns how each sub-system of the ignition system supports the overall production of spark. Factory engine settings and gaps are covered to insure proper spark production and a careful step-by-step reassembly is accomplished. Extreme caution is stressed in the re-installation of the breaker points, flyweight and retaining spring.

Powerhead - Disassembly – SET-U1WS-A07

This program covers the disassembly of a two-cycle short block starting with the rod cap, needle bearings, liners, crankshaft and rod assembly. The student learns combustion theory and the purpose of each powerhead component. The four different phases of piston travel are covered and relate to the production of reciprocating power.

Powerhead - Inspection – SET-U1WS-A08

A worksheet is used in this program to enable the student to readily identify each powerhead component and the inspection checks that need to be accomplished on each one. The function of each component is carefully explained and the proper cleaning methods are discussed.

Powerhead - Assembly - SET-U1WS-A09

Powerhead build-up deals initially with proper positioning of the piston and the rings on the piston. Re-installation of needle bearings and piston rings require special techniques and tools. Each installation process is covered slowly and carefully to insure the student grasps the importance of proper factory-approved rebuilding.

Major Components - Disassembly – SET-U1WS-A10

This program introduces the student to the removal of the integral engine components from the short block. He is shown how to use special tools and after the components are removed, the student learns briefly how each unit functions and how it contributes to the two cycle engine as a whole.

Major Components - Inspection – SET-U1WS-A11

The student receives an in depth coverage of each two cycle major component, and how it interacts with other components to produce power. A worksheet is used to identify and label each component. The student also uses colored pencils to shade in and identify the three engine systems – fuel, spark, and air flow.

Major Components - Assembly – SET-U1WS-A12

This program instructs the student in the reassembly of the major engine components in an explicit step-by-step manner – paying close attention to factory specifications and procedures. Several special tools are used to complete the assembly and give the student experience in the use of tools peculiar to one type of engine.

Piston and Rod - Disassembly – SET-U1WS-A13

The piston and rod are dealt with as a separate unit in this program. The student learns the importance of the piston rings in combustion theory. The function of the piston head, connecting rod, wrist pin, etc. is discussed and the student becomes acquainted with several special tools that assist his disassembly of the piston and rod. The program briefly covers the four piston stages in combustion.

Piston and Rod - Inspection – SET-U1WS-A14

A student worksheet is used in this program to help the student identify the various piston and rod components. He learns the value of inspection and cleaning of the disassembled parts to insure top engine performance.

Piston and Rod - Assembly – SET-U1WS-A15

This program devotes time to two cycle engine theory, showing the student how the various piston stages act in creating a combustion situation which is transferred to the crankshaft to create reciprocating power. The student then begins to reassemble the piston and rod while relating each component and its function to two cycle engine theory.

Engine Accessories - Disassembly – SET-U1WS-B16

This program is essentially a review. The student goes over the various accessory components such as the fuel tank, air filter, starter assembly, etc. and learns the function and value of each. During disassembly, proper shop practices are constantly stressed as an important part of being a technician.

Engine Accessories - Inspection – SET-U1WS-B17

During this program the student completes an illustrated worksheet which allows him to identify various engine components while relating their functions to the engine as a whole. The student learns the proper cleaning and inspection methods for each item and he explores the inner workings of the large and small accessory components.

Engine Accessories - Assembly – SET-U1WS-B18

This program covers the reassembly of the engine accessories previously removed. Once again, the program's stress is on accurate and precise parts assembly – paying close attention to detail and factory recommendations. The functions of each engine accessory are briefly reviewed for student to insure his understanding of the two cycle engine as a whole.

Carburetor Servicing – SET-U2WS-B01

The student removes a typical four-cycle carburetor from a partially disassembled engine. As the disassembly progresses, the student learns how to determine what condition each component is in and whether it requires repair or replacement. The student learns the functions of each carburetor component during this process.

Four Cycle Carburetor – SET-U2WS-A02

The student is introduced to four cycle carburetor theory and function. Through the use of a worksheet the student learns the six basic carburetor systems and becomes familiar with the carburetor components that make up each system. (Example: Main metering system; main and boost venturi; main well and discharge nozzle).

Cooling System – SET-U2WS-A03

The problem of heat production and the provision for heat dissipation in the internal combustion engine is discussed. Two types of heat transfer – air cooling and liquid cooling are incorporated in illustrations on a worksheet and the student identifies the component parts of both type engines that contribute to heat reduction during operation.

Wiring Diagrams – SET-U2WS-A04

A typical automobile type electrical system is used in worksheet diagram form to teach the student how to read and interpret wiring diagrams. The student traces each separate circuit by coloring in the diagram and he is introduced to simple electrical symbols and definitions. The diagram helps to trace the electrical current flow from the storage battery through the various components with emphasis placed on the starting and ignition circuits.

Using the Micrometer – SET-U2WS-A05

This program begins by acquainting the student with the decimal system. This is accomplished by the use of coins and currency as examples. Once the student is acquainted with decimals, he is introduced to the micrometer, learns the identity of each part and is shown how to operate and correctly read the instrument. As the program progresses, the student transfers all this information to a worksheet and completes the work by comparing actual micrometer readings from a crankshaft and wrist pin to the factory specs listed on the worksheet.

Preventive Maintenance – SET-U2WS-A06

This program stresses the importance of periodic checks and routine maintenance to extend the life of an engine. As an example, an outboard engine is followed through a full year and the proper procedures are discussed for storage, running, and preparation for running and storage. The student completes a worksheet annotating the above information and is able to see the overall importance of proper treatment of the gasoline engine.

Powerhead Disassembly – SET U2WS-A07

This program allows the student to begin component disassembly on a Briggs & Stratton powerhead. He is instructed in the use of special tools to remove engine parts and as each major item (i.e. cylinder head, valves, piston) is uncovered, the student physically checks the condition of the component and annotates the checks made on a worksheet that illustrates those parts.

Powerhead Operation – SET-U2WS-A08

Through use of a worksheet the student learns the function of each engine component and how it works in conjunction with the others to produce power. The student colors in the various systems, traces the direction of movement of various parts, and works with the actual engine parts from the preceding program.

Powerhead Assembly – SET-U2WS-A09

During this program, the student uses the knowledge he has gained so far as he begins to reassemble the powerhead. Each assembly step is carefully explained and the special tool handling procedures are described. Inspection tool instruction is also given, allowing the student to learn proper handling techniques and the importance of factory specification assembly.

Tappets and Cams – SET-U2WS-A10

The function of valve tappets and camshafts in four cycle engines is discussed and the student learns how to check wear areas and measure factory spec clearances. Upon removal of the valves, tappets, and timing gear and camshaft, the student learns how to determine when a camshaft exceeds its wear limits. He then begins a step-by-step reassembly of the engine paying close attention to the proper fit of seals and gaskets.

Valve Servicing – SET-U2WS-A11

The importance of proper valve maintenance and servicing is stressed in this program. The student removes the cylinder head, learns how to identify valves, and removes the valves using special tools. Several different types of valve problems are discussed. Valve grinding procedures are covered and then the student learns proper valve lapping technique, and finally, checks valve gap. Upon reassembly of the cylinder head, the student will more fully understand the vital role the valves play in overall engine performance.

Crankshaft Bearings – SET-U2WS-A12

The student begins this program by disassembling the Briggs engine to the point where he can remove the crankshaft. A visual inspection of the crankshaft is next and the student learns exactly how and why the crankshaft functions the way it does. To assist the student, a maintenance manual is provided for checking factory tolerances on the crank journal, main bearings and bushings. Emphasis is placed on correct torque values, assembly methods and the proper fit between mating components.

Starter Servicing – SET-U2WS-A13

The purpose of this program is to familiarize the student with a four cycle engine rewind starter. The student is instructed how to remove the starter from the engine with the use of special tools and cautioned about the danger of the coiled spring. Upon removal of the starter components, each separate component is discussed and inspected thoroughly. Finally, explicit instructions are given for rewinding the starter spring and reassembly of the clutch.

Basic Trouble Diagnosis – SET-U2WS-A14

This program presents a simple common sense formula to troubleshooting a small engine. The student learns the diagnostic tricks and tips of efficient repair and is carefully shown each of the tests that must be accomplished on the fuel, spark, and compression systems. The student uses several inspection tools to check factory parts specifications, tolerances, and gaps and then receives a brief troubleshooting review, helping him remember the importance of the systematic approach to engine problem solving.

Ignition Servicing – SET-U2WS-A15

After a brief discussion of magneto theory and function supported by graphic illustrations – the student is instructed to remove the magneto from his engine, step-by-step. He then learns how to perform clearance gap and inspection checks on the magneto components. Upon completion of the checks, the student reassembles the magneto unit paying close attention to proper factory approved assembly technique.

Fuel Pumps – SET-U2WS-A16

In this program, different types of fuel pumps are discussed and a lever-operated mechanical fuel pump is selected for study. The student completes a worksheet by filling in the names of each fuel pump part and coloring in the corresponding illustrations of that part in a cross-sectional and exploded view. The student completes the worksheet while receiving fuel pump function theory and operation.

Using the Parts Catalog – SET-U2WS-A17

Two different Lawn-Boy parts catalogs are used in this program to help the student learn the proper use of technical literature. He learns how to locate model numbers and uses illustrated parts breakdowns or exploded views to identify part numbers. Accuracy is stressed as an important function of parts ordering.

Four Cycle Theory – SET-U2WS-A18

This program covers a discussion of the four-stroke gas engine cycle and briefly explains all the engine component's functions during one cycle. Other supporting systems and components are covered, fully explaining each one's action. Upon completion of a worksheet dealing with the four phases of the four stroke cycle, the student should have a good working knowledge of gasoline engine power production theory.

UNIT III - APPLICATIONS

Electric Starter Overhaul – SET-U3WS-C01

A short discussion of manual and electric starters helps the student understand the different theory and application of each starter type. An outboard engine electric starter is used for the disassembly and testing. The student learns how to perform various tests with a growler tester such as checking for shorted windings, a cracked housing, or short circuits. Cleaning and inspection procedures are discussed. The student then reassembles the starter.

Alternators/Generators – SET-U3WS-A02

This program delves into magnetic theory and magnet characteristics. One worksheet is provided for the student to identify a generator's functional components such as the coil and armature and learn their purposes. The difference between a generator and an alternator is explained as is the method by which an alternator creates direct current. A second worksheet assists the student's understanding of alternators.

Electrical System Maintenance – SET-U3WS-A03

This program includes two worksheets with illustrations of common automobile electrical components. The student learns to identify each item (battery, voltage regulator, generator, etc.) and sees each one in a cross-sectional cutaway view. He learns which areas require checking and maintenance and how to prevent component failure by early trouble diagnosis and repair.

Engine Tune Up – SET-U3WS-A04

The student learns the importance of the four step servicing procedure for small engines in this program. While completing a worksheet, the student identifies various lawn mower components and realizes why a visual inspection, cleaning, adjustment and parts replacement is important to the servicing situation.

Magneto Theory and Testing – SET-U3WS-A05

This program utilizes a special ignition analyzer to test magneto components and introduce the student to the magneto servicing aspect of small engine repair. The student removes the magneto from his engine, reviews the specific function of each component, and then systematically checks each one for various electrical capabilities. Upon completion of the test, the student reassembles the magneto to the engine.

Spark Plug Servicing – SET-U3WS-A06

One worksheet provided with this program covers the physical aspects of spark plug construction, allowing the student to learn the function and theory of spark production. "Hot" and cold plugs are discussed on a second worksheet as are the servicing procedures and checks. Finally, the student is acquainted with the various plug tip conditions and their relationship to engine performance.

Using Torque Wrenches – SET-U3WS-B07

This program is introduced by a discussion of various torque wrench types. Leverage and the mathematical formula for computing torque is simplified through illustrations. The student learns what foot pounds and inch pounds are in terms of torque and how to convert one to the other. The program covers varying applications of adapters for working under difficult torquing situations and the importance of torquing sequences. The student learns the proper use of a Snap-On Torque Computer and Torquemeter and physically accomplishes a torquing procedure on an engine cylinder head.

Using the Service Manual – SET-U3WS-A08

With the assistance of a worksheet, this program covers the proper use of a Briggs & Stratton repair instructions manual. Each chapter is reviewed for the material it contains on the student's engine series. As the program progresses, the student fills in the pertinent information relating to his engine and answers questions on his worksheet.

Using Troubleshooting Charts – SET-U3WS-A09

The student learns the importance of a logical, systematic approach to troubleshooting. Each of the three engine systems -- ignition, fuel and compression are covered in a troubleshooting breakdown format for the student. This program requires the use of a typical troubleshooting booklet. The booklet has separate note pages for the student's use. The stress of the program is on a common sense approach to troubleshooting.

Tecumseh Disassembly – SET-U3WS-B10

Some of the basic differences of four cycle engines are demonstrated in this program by the disassembly of a Tecumseh four-cycle air-cooled 3-1/2 horsepower engine. During disassembly of the engine, the student compares differences and similarities of the Tecumseh to the Briggs & Stratton engine he has worked with previously. The student follows explicit factory approved methods of component removal and uses several special tools to assist the disassembly procedure.

Tecumseh Clean and Inspect – SET-U3WS-B11

This program thoroughly covers the numerous procedures involved in inspection and cleaning of the Tecumseh engine. The student uses a worksheet to visually identify various engine components and annotate the inspection procedures for each one. The student also uses some special inspection tools such as a telescoping gage, a ring expanding pliers and a micrometer to test for wear condition of the engine parts.

Tecumseh Assembly – SET-U3WS-B12

The importance of this program lies in the careful, step-by-step directions of reassembly of the Tecumseh engine. The student learns to accurately organize and coordinate parts for proper alignment and installation. At the same time, he gains knowledge of the use and efficiency of special tools to speed the reassembly process.

O & R Disassembly – SET-U3WS-A13

Dealing with a two cycle engine variation, the student is introduced to the one horsepower O & R two cycle, air-cooled engine. The student is led through a detailed instructional parts removal paying close attention to the particular O & R peculiarities.

O & R Clean and Inspect – SET-U3WS-A14

Every engine component requiring service or inspection is illustrated on one of two worksheets which the student reviews and fills out noting the particular instructions and tips for each particular component next to the proper illustration. Cleaning suggestions are made for various components stressing the fact that wear or damage may be concealed by engine deposits.

O & R Assembly – SET-U3WS-A15

As in other reassembly programs this program concentrates on the correct assembly procedures. Each part of the O & R engine is carefully re-installed by the student as he learns how to handle intricate and delicate components.

Sanshin Powerhead Disassembly – SET-U3WS-B16

The student is introduced to a special type of two cycle engine in this program, the powerhead of an outboard motor. He is introduced to metric tools as he performs the component disassembly on the water cooled engine, following procedures recommended in the Sanshin Service Manual.

Sanshin Powerhead Clean and Inspect – SET-U3WS-B17

Two illustrated worksheets are used during this program, as the student performs and records inspection steps and procedures. Special attention is given to engine clearances and tolerances. As the student learns to recognize each component, he is instructed on the proper cleaning techniques.

Sanshin Powerhead Assembly – SET-U3WS-B18

The components of the Sanshin powerhead are carefully assembled with the aid of both metric and common hand tools during the step-by-step procedure provided during this program. Students are instructed to use the proper tools to assure a correctly assembled engine.

A-12

Book Lists and Book Storage*

PURPOSE: This worksheet provides you with lists of books, by activity areas, that have been used in Career Exploration (Occupational Versatility) shops. This list, of course, cannot be considered complete because it is impossible to know all texts and other printed materials that may be available and could be recommended for each activity. The lists, however do represent a place to start in making collections of useful material. You are encouraged to be on the look-out for new and promising books and publications that are announced by publishers and in professional journals.

*Source: R.I.E.P. Teacher Handbook

WOODS BOOK LIST

PURPOSE: This suggested book list covers a wide variety of different books related to woodworking. Check the columns to determine what books you will need.

COLOR CODING: Cut a strip of 1" colored contact paper and place over the back of each book. Use yellow for wood.

VENDOR I.D. #: 9, 12, 13, 25, 44, 46

BILL OF MATERIALS: Pencil in the information necessary to prepare for your book order.

ON HAND	NO. REQ.	TITLE, AUTHOR, PUBLISHER	TO ORDER	SUPPLIER	COST
	1	Bench Woodwork, Feirer, Hutchings Charles A. Bennett, Inc.			
	1	Contemporary Lamps, Holbrook McKnight & McKnight Co.			
	2	Exploring Woodworking, Zimmerman Goodheart & Willcox			
	2	General Woodworking, Groneman McGraw-Hill Book Co.			
		Getting the Most out of Your . . .			
		Band Saw			
		Circular Saw			
		Drill Press			
		Lathe			
		Scroll Saw/Jointer Deltacraft Publications			
		Practical Finishing Methods, Delta Publishing			
	2	Industrial Arts Woodworking, Feirer, Chas. A. Bennett, Inc.			
	1	Modern Carpentry, Wagner Goodheart & Willcox			
	1	Make Your Own Sports Gear, Spielman, Bruce Publishing			
	1	Projects in Wood Furniture, Douglas-Roberts, McKnight & McKnight			
	2	Woodworking, Wagner Goodheart-Willcox			
	1	Basic Woodworking Projects, McGinnus-Ruley, McKnight & McKnight			

ON HAND	NO. REQ.	TITLE, AUTHOR, PUBLISHER	TO ORDER	SUPPLIER	103 COST
	1	Woodworking Technology, 1972 Hammond, Donnelly, Harrod, Ryner, McKnight & McKnight			
	1	Cabinetmaking, Feirer Charles A. Bennett, Inc.			
	1	Woodturning, E. Rebhorn 1970 McKnight & McKnight			
	1	Carpentry, Wagner Goodheart & Willcox			
	1	Art of Woodturning, Klenke Charles A. Bennett, Inc.			
	1	Woodturning Visualized, R. C. Cramlet, Bruce Publishing			
	1	Woodworking for Industry, Feirer, Chas. A. Bennett, Inc.			
	1	Operations of Modern Woodworking Machines, Hyorth-Hotrop Bruce Publishing Co.			

BOOK COST: Add up cost column and enter on Estimated Cost blank.

EST. COST _____

METALS BOOK LIST

PURPOSE: This suggested list covers a wide variety of different books about metalworking. Check the columns to determine what books you will need.

COLOR CODING: Place a piece of 1" colored contact paper over the back of each book.

VENDOR I.D. #: 12, 17, 25, 44, 46

BILL OF MATERIAL: Pencil in the necessary information you need to prepare your book order.

ON HAND	NO. REQ.	TITLE, AUTHOR, PUBLISHER	TO ORDER	SUPPLIER	COST
	2	Exploring Metal Working, Walker, Goodheart-Willcox			
	1	General Metals, Feirer McGraw-Hill, 1967			
	1	Metal Work, Feirer, Lindbeck Chas. A. Bennett Co.			
	1	Modern Metal Working, J. Walker Goodheart & Willcox			
	1	Metal Working 2, Boyd Goodheart & Willcox			
	1	Practical Metal Projects 2, Ruley, McKnight & McKnight			
	1	Projects in General Metal Working 2, Ruley, McKnight & McKnight			
	1	Technical Metals, Johnson Chas. A. Bennett, Inc. 1973			
	2	Sheet Metal, R. Smith McKnight & McKnight			
	1	Modern General Shop, Borwn Wagner, Boyd, Gerrish Goodheart & Willcox			
	1	Metalwork-Technology & Practice, Ludwig, McCarthey			
	1	Turning Technology, Krar, Oswald, Delmar Publishing			
	1	Machine Tool Technology, McCarthy-Smith McKnight & McKnight Co.			

HOT METALS BOOK LIST

PROCEDURE: Check through this suggested book list and see if you will need to order more books to begin your Hot Metals program.

COLOR CODING: So that students can locate reference material, a small strip of colored contact paper is placed over the back of each book.

VENDOR I.D. #: 17, 25, 46

BILL OF MATERIAL: Using a current catalog, pencil in the publisher and cost.

ON HAND	NO REQ	TITLE, AUTHOR, PUBLISHER	TO ORDER	SUPPLIER	COST
	2	Forging & Welding, Smith McKnight & McKnight			
	2	Heat Treatment of Metals Litton Ed., Delmar Pub.			
	1	Modern Welding, Bowditch Althouse & Tuinquist, Goodheart - Willcox			
	1	Welding Processes, Griffin-Roden, Delmar Pub.			
	1	Basic Arc Welding, Griffin-Roden, Delmar Pub.			
	1	Basic Oxy-acetylene Welding, Griffin & Roden, Delmar Pub.			
	1	Arc Welding, Walker Goodheart-Willcox			
	4	Welding, Cutting & Heating Guide, Victor Cutting & Welding Division			

BOOKS COST

EST. COST_____

PLASTICS BOOK LIST

PURPOSE: Instead of ordering a complete set of books, we suggest that you order a wide variety of different books. Check through the list and add to it if necessary.

COLOR CODING: A strip of colored contact paper is placed on the back of each book so students can find reference material. A different color of contact paper is used for each activity area.

VENDOR I.D. #: 12, 25, 44, 46

BILL OF MATERIAL: Pencil in the cost of each book using a current catalog.

ON HAND	NO. REQ.	TITLE, AUTHOR, PUBLISHER	TO ORDER	SUPPLIER	COST
	2	Industrial Arts Plastics, 1964 Edwards, Chas. A. Bennett Co.			
		Industrial Plastics 3, 1971 Baird, Goodheart & Willcox			
	2	Plastics, Cope & Conway 1966 Goodheart & Willcox			
	1	Plastic Projects and Techniques, Lappin McKnight & McKnight Co.			
		Plastics Technology, Swanson McKnight & McKnight Co, 1965			
		General Plastics, Cherry McKnight & McKnight 1967			
		Modern Plastics, McGraw-Hill Encyclopedia 1970-71			
		Fiber Glass, Projects & Procedures, Steele McKnight & McKnight Co.			

BOOK COST:

EST. COST _____

CRAFT BOOK LIST

PURPOSE: Since the Craft area covers a wide variety of different activities, just a few books have been suggested. Consider the activities you will include in your Craft area and add books to this list if necessary.

COLOR CODING: From colored contact paper, cut 1" strips and place over the back of each book.

VENDOR I.D. #: 9, 12, 25, 46, 58

BILL OF MATERIAL: Fill in the necessary information for your crafts book order.

ON HAND	NO. REQ.	TITLE, AUTHOR, PUBLISHER	TO ORDER	SUPPLIER	COST
	2	Artistic Metalwork, Bick Bruce Publishing			
	2	Basic Crafts, Lindbeck-Hansen Charles A. Bennett Co. 1969			
	2	Leathercraft (2), Groneman Charles A. Bennett Co.			
	2	General Leathercraft, Cherry McKnight & McKnight Co.			
	1	Ideas for Leather Belts You Can Make, A. Stohlman, Tandy Leather Co.			
	1	Leather Work, Stohlman, Patton, Wilson, Tandy Leather			
	2	Art Metals, Seigner Goodheart-Willcox			
	1	Essentials of Modern Upholstery, Bast, Bruce Publishing			
	1	Handwrought Jewelry, Franke McKnight & McKnight Co.			

BOOK COST:

EST. COST_____

POWER MECHANICS BOOK LIST

PURPOSE: This suggested book list will help you start your Power Mechanics activity area. You will need to add to this list as you expand the number of activities in your Power Mechanics area.

COLOR CODING: A 1" strip of colored contact paper is placed over the back of each book so that students can locate reference material easily.

VENDOR I.D. #: 8, 25, 27

BILL OF MATERIAL: Check appropriate columns and pencil in the necessary information.

ON HAND	NO. REQ.	TITLE, AUTHOR, PUBLISHER	TO ORDER	SUPPLIER	COST
	2	All About Small Gas Engines J Purvis, Goodheart-Willcox			
	1	Auto Mechanics Fundamental Stockel, Goodheart-Willcox			
	1	Automotive Encyclopedia Toboldt, Johnson Goodheart-Willcox			
	1	Power Mechanics Atteberry, Goodheart-Willcox			
	2	Small Gas Engines T. Pipe, Howard W. Sams & Co.			
	1	Auto Body Repairing & Repainting, B. Tobodbt, Goodheart & Willcox			
	2	General Theories of Operation Briggs & Stratton			
	2	Repair Instructions II Briggs & Stratton			
	2	Small Engines Service Manual Intertec Pub. Corp. 1969			

BOOK COST:

EST. COST _____

GRAPHICS BOOK LIST

PURPOSE: This is a suggested list to help you develop a graphics activity area. Check the appropriate columns to see what books you will need to order.

COLOR CODING: A 1" strip of colored contact paper is cut and placed over the back of each book.

VENDOR I.D. #: 12, 25, 46

BILL OF MATERIAL; Pencil in the necessary information.

ON HAND	NO. REQ.	TITLE, AUTHOR, PUBLSIHER	TO ORDER	SUPPLIER	COST
	2	Graphic Arts, Carlsen Charles A. Bennett Co.			
	2	Silk Screen Printing, Eisenberg & Kafka McKnight & McKnight Co.			
	1	General Printing, Pitkin - Cornwell McKnight & McKnight Co 1963			
	1	Practical Photography, McCoy, 1972 McKnight & McKnight Co.			
	2	Graphic Arts, Kagy Goodheart - Willcox 1965			

BOOK COST:

EST. COST_____

GENERAL INDUSTRIES BOOK LIST

PURPOSE: Since the General Industries area covers a wide variety of different activities, just a few books have been suggested. Consider the activities you will include in your General Industry area and add to this list if necessary.

COLOR CODING: From colored contact paper, cut 1" strips and place over the back of each book.

VENDOR I.D. #: 12, 17, 25, 46, 57

BILL OF MATERIAL: Check the appropriate columns and pencil in the necessary information.

ON HAND	NO. REQ.	TITLE, AUTHOR, PUBLISHER	TO ORDER	SUPPLIER	COST
	1	Modern Carpentry, Wagner Goodheart & Willcox			
	1	Woodworking for Industry, Feirer, Charles A. Bennett, Inc.			
	1	House Wiring Simplified, Mix, Goodheart & Willcox			
	1	Home and Building Maintenance, Woodin, Hayes-McKnight & McKnight			
	1	Walks, Walls & Patio Floors, Sunset Lane Books			
	1	Bricklaying 1, Delmar			
	1	Bricklaying 11, Delmar			
	1	Concrete Technology, Delmar			

BOOK COST:

EST. COST _____

ELECTRICITY/ELECTRONICS BOOK LIST

PURPOSE: So that you will know about some of the books useful in this activity area, we are furnishing this suggested book list.

COLOR CODING: Cut a 1" strip of colored contact paper and place over the back of each book.

VENDOR I.D. #: 9, 25, 27, 46, 53

BILL OF MATERIAL: Refer to the publishers' catalogs and pencil in the supplier and cost in the spaces provided.

ON HAND	NO. REQ.	TITLE, AUTHOR, PUBLISHER	TO ORDER	SUPPLIER	COST
	1	All About Home Wiring, F. Mix Goodheart & Wilcox			
	1	Home Mechanics, Schaefer, Smith Bruce Publishers			
	2	Electronics 4, Gerrish Goodheart & Willcox			
	1	How to Repair Small Appliances, J. Darr, Howard W. Sams, Inc.			
	1	Projects in Electricity Collings, McKnight & McKnight			
	1	House Wiring Simplified, F. Mix Goodheart-Willcox			
	1	Simplified Electrical Wiring Sears Roebuck & Co.			
	2	Exploratory Electricity Arnold, Shank McKnight & McKnight			
	1	Exploring Electronics Gerrish, Goodheart-Willcox			

BOOK COST:

EST. COST_____

DRAFTING BOOK LIST

PURPOSE: To give you an idea of the type and amount of books to start a drafting area, this suggested list is furnished.

COLOR CODING: Cut a strip of 1" colored contact paper and place over the back of each book.

VENDOR I.D. #: 12, 17, 25, 46

BILL OF MATERIAL: Pencil in the necessary information to prepare for ordering the books you will require.

ON HAND	NO. REQ.	TITLE, AUTHOR, PUBLISHER	TO ORDER	SUPPLIER	COST
	1	Drawing & Planning for Industrial Arts, Feirer Chas. A. Bennett Inc. 1963			
	1	The World of Drafting, Ross McKnight & McKnight Co, 1971			
	2	Exploring Drafting, Walker Goodheart & Willcox, 1972			
	1	General Architectural Drawing, Wyatt, Chas. A. Bennett, Inc.			
	1	Drafting, W. Brown, Goodheart & Willcox			
	1	Drafting, Industrial Arts, Walker-Pleveyk Goodheart & Willcox			
	1	Drafting Technology, Horton, Rothaus, Delmar Publishing			

BOOK COST:

EST. COST_____

1. ALLIED ELECTRONICS
12311 Industry
Garden Grove, CA
Phone: (213) 598-6605

2. AMERICAN HANDICRAFT
4300 N. E. Sandy Blvd.
Portland, OR 97213
Phone: (503) 288-5701

3. AMERICAN STEEL & SUPPLY
4033 N. W. Yeon
Portland, OR 97210
Phone: (503) 226-1511

4. AUDIO VISUAL SUPPLY CO.
6420 N. E. Halsey
Portland, OR 97213
Phone: (288-6102)

5. BARBO MACHINERY CO.
1126 S. E. Division
Portland, OR 97202
Phone: (503) 232-8158

6. BFA EDUCATIONAL MEDIA
909 N. E. Linden
Hillsboro, OR 97123

7. BRODHEAD-GARRETT
13538 Tiki Lane
Springfield, OR 97477
Phone: (503) 746-8525

8. BROWN & WISER, INC.
1411 N.W. Flanders
Portland, OR 97209
Phone: (503) 226-1111

9. BRUCE PUBLISHING CO.
8701 Wilshire
Beverly Hills, CA
Phone: (213) 657-4800

10. BRUNING CO.
2136 S. W. Fifth
Portland, OR 97210
Phone: (503) 224-4120

11. BUTTERWORTH, INC.
5417 N. E. 30th Avenue
Portland, OR 97211
Phone: (503) 288-6733

12. CHARLES A. BENNETT CO., INC.
809 West Detweiller Drive
Peioria, IL 61614
Phone: (309) 691-4454

13. CHOWN HARDWARE
333 N. W. 16th
Portland, OR 97209
Phone: (800) 452-7634

14. COMARK PLASTICS DIVISION
1407 Broadway
New York, NY 10018
Phone: (212) 564-6000

15. COPE PLASTICS, INC.
4441 Industrial Drive
Godfrey, IL 62035
Phone: (618) 466-0221

16. CRAFTOOL COMPANY, INC.
1421 S. 240th Street
Harbor City, CA 90710
Phone: (213) 325-9696

17. DELMAR PUBLISHERS
P. O. Box 5087
Albany, NY 12205
Phone: (518) 459-1150

18. DELVIE'S PLASTIC, INC.
2320 S.W. Temple
Salt Lake City, UT 84110
Phone: (801) 467-1548

19. DIETZGEN CORPORATION
1550 Hymer Avenue
Sparks, NV 89431
Phone: (800) 648-1136

20. DISTRICT MAINTENANCE

21. EMERSON HARDWOOD CO.
2279 N. W. Front Avenue
Portland, OR 97209
Phone: (503) 227-6414

22. EVERGREEN TOOL CO.
2429 S. E. 11th
Portland, OR 97214

23. EYE-GATE HOUSE
146-01 Archer Ave.
Jamaica, NY 11435
Phone: (212) 291-9100

24. GENERAL TOOL & SUPPLY CO.
407 N. W. 17th
Portland, OR 97209
Phone: (800) 452-3505

25. GOODHEART-WILLCOX
123 West Taft Drive
South Holland, IL 60473
Phone: (312) 333-7200

26. HONACAST DIVISION
400 Walnut Street
Yonkers, NY 10701
Phone: (914) 423-2146

27. HOWARD W. SAMS & CO., INC.
4300 West 62nd Street
Indianapolis, IN 46268
Phone: (317) 291-3100

28. INDUSTRIAL ARTS SUPPLY CO.
5724 West 36th Street
Minneapolis, MN 55416
Phone: (612) 920-7393

29. J. K. GILL CO.
2725 N. W. Industrial
Portland, OR 97210
Phone: (503) 226-4611

30. KEUFFEL & ESSER CO.
P. O. Box 2030
Seattle, WA 98111
Phone: (206) 623-5535

31. LA GRAND INDUSTRIAL SUPPLY
2620 S. W. First
Portland, OR 97201
Phone: (503) 224-5800

32. LEMONS MILLWORK, INC.
224 East 31st
Albany, OR 97321
Phone: (503) 926-1463

33. LIBRARY FILM STRIP CENTER
3033 Aloma
Wichita, KA 67211

34. LOCAL CABINET COMPANY

35. LOCAL ELECTRICAL VENDOR

36. LOCAL HARDWARE STORE

37. LOCAL LUMBER DEALER

38. LOCAL PAINT STORE

39. LOCAL PRINTER

40. LOCAL STATIONERY STORE

41. LOCAL VENDOR

42. LOCAL WELDING VENDOR

43. LUMBER PRODUCTS
2116 N. W. 20th Ave.
Portland, OR 97209
Phone: (503) 223-8170

44. McGRAW-HILL BOOK CO.
8171 Redwood Highway
Novato, CA 94947
Phone: (415) 897-5294

45. McGRAW HILL FILM DIVISION
330 West 42nd Street
New York, NY 10036

46. McKNIGHT PUBLISHING CO.
Bloomington, IL 61701
Phone: (309) 663-1341

47. MONITOR PRODUCTS
300 South Alaska
Tacoma, WA 98409
Phone: (206) 475-5800

48. MOORE'S AUDIO VISUAL CENTER, INC.
234 S.E. 12th
Portland, OR 97214
Phone: (503) 233-5621

49. NATIONAL BUILDERS HARDWARE CO.
1215 S. E. 8th
Portland, OR 97214
Phone: (503) 233-5381

50. NORTH PACIFIC LUMBER CO.
P. O. Box 3915
Portland, OR 97208
Phone: (503) 234-8241

51. OREGON STATE UNIVERSITY
Industrial Education Department
Corvallis, OR 97331
Phone: (503) 754-2733

52. PACIFIC METAL CO.
3400 S. W. Bond
Portland, OR 97201
Phone: (503) 227-0691

53. SEARS, ROEBUCK & CO.

54. STANDARD PAPER CO.
P. O. Box 2134
Tacoma, WA 98401
Phone: (206) 922-8792

55. STAR MACHINERY CO.
3325 N. W. Yeon
Portland, OR 97210
Phone: (503) 226-3011

56. STERLING FILMS
1110 N. W. Garfield
Corvallis, OR 97330
Phone: (503) 753-8562

57. SUNSET - LOCAL BOOK STORE

58. TANDY LEATHER CO.
5132 N. E. Sandy Blvd.
Portland, OR 97213
Phone: (503) 282-7121

59. TELEDYNE POST
1915 4th Avenue South
Seattle, WA 98134
Phone: (206) 622-0888

60. THORNE FILMS, INC.
Dept. 1A-73
1229 University Ave.
Boulder, CO 80302
Phone: (303) 443-4480

61. TOMAHAWK CORPORATION
748 East Walnut
Hillsboro, OR 97123
Phone: (503) 648-5622

62. TUCKER & SONS
P. O. Box 8008
Tacoma, WA 98408
Phone: (206) 474-8426

63. UNITED RADIO SUPPLY, INC.
123 N.E. 7th Avenue
Portland, OR 97232
Phone: (503) 233-5346

64. WEST COAST PAPER CO.
2203 1st Avenue South
Seattle, WA
Phone: (206) 623-1850

65. WESTERN INDUSTRIAL SUPPLY CO.
208 S.E. Hawthorne Blvd.
Portland, OR 97214
Phone: (503) 639-5913

A-13

Rural Industrial Education Assessments and Interview Instruments*

A. General Factors

B. Occupational Study

C. Teacher Interview Guide

D. Principal Interview Guide

E. Parent Interview Guide

F. Tribal Officials Interview Guide

*Source: Rural Instructional Education Project Manual

REAA _____

SCHOOL _____

DATE _____

RURAL INDUSTRIAL EDUCATION PROJECT

PHYSICAL ARRANGEMENTS OF COMMUNITY AND SCHOOL:

I. GENERAL

1. Is electricty available ? _____ (cycle) Cost to dist. _____
   What source ? _____ Capacity _____ 110 V _____ 220V _____

2. How dependent is community/school on electricty ? _____
   Heating _____ Recreation _____

3. Transportation linkage to this site _____ was by _____
   _____ from _____ to _____
   hours _____ cost _____

4. How frequently does mail arrive on schedule ? _____

5. Other transportation possibilities _____
   Communications _____

6. Seasonal problems _____
   (i.e., spring thaw, air strip, no skiis)

7. How will weather conditions affect travel/schedules ? _____
   _____

8. What is water source for community ? _____

9. Other notes _____
   _____
   _____
   _____
   _____

II. SCHOOL BUILDING

1. Sq. ft. area width _____ x length _____ = sq. ft. _____

2. Kind of construction _____ floor material _____

3. No. of windows _____ where located _____

possible ventilation _____ size of doors _____

storage space _____

4. No. of electrical outlets _____ location _____

_____

5. Total enrollment K-12 _____ K-6 _____ 7-8 _____

9-12 _____ Potential FTE in Voc Ed. _____

6. Availability of teacher aides - paraprofessionals _____

_____

7. Any local sources of teaching supplies _____

8. List names of potential teacher aides:

NAME	SKILL AREA
_____	_____
_____	_____
_____	_____
_____	_____

9. List names of community resource persons:

NAME	RESOURCE AREA
_____	_____
_____	_____
_____	_____
_____	_____

REAA _____

RURAL INDUSTRIAL EDUCATION PROJECT

SCHOOL _____

119

DATE _____

OCCUPATIONAL

ADULT

1. Kinds of available occupations _____

_____

2. Potential occupations if some training were available _____

_____

What specific training ?_____

_____

3. What is the employment/unemployment picture ?_____

_____

How seasonal _____

4. Compile roster of resource people who may assist in voc. ed. programs _____

_____ (local mechanic, electrician, boat builder as teacher aide) - or cadre of expertise _____

_____

5. What are adult aspirations about their job status and future? _____

_____

What kinds of training might they need ?_____

_____

6. Would you be interested in adult courses offered in voc. ed.?_____

_____

7. What courses would you like to see offered ?_____

_____

STUDENTS

1. What kinds of summer job are available? _____

_____

2. What are your career aspirations and expectations?_____

_____

3. What are your future plans following high school? _____

_____

4. Of all high school courses, which were most important to you and which were the greatest waste of time? _____

_____ Why? _____

_____

_____

GENERAL

1. How would you go about training/teaching students in order to carry on your tribal culture customs, i.e., ivory carving, basket weaving, etc.? _____

_____

_____

2. What are your general feelings about this survey? _____

_____

Why? _____

_____

_____

REAA _____

COMMUNITY/SCHOOL _____

DATE _____

BY _____

RURAL INDUSTRIAL EDUCATION PROJECT

OCCUPATIONAL DATA SUMMARY SHEET

1. What is current overall employment picture of your community?

Highly seasonal _____(Kinds of jobs) _____

Stable _____ (Kinds of jobs) _____

High rate of unemployment _____ Approx. what % _____ Adult %_____ Youth %_____

Indicate existing or potential jobs as you relate them to the occupational clusters (attached separately).

MAJOR CLUSTER	(← RELATED JOB →)		
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

MAJOR CLUSTER	(← INDIRECTLY RELATED →)		
_____	_____	_____	_____
_____	_____	_____	_____

What kinds of special training might provide a better employment environment? (adult and youth).

TRAINING	POTENTIAL EMPLOYMENT AREA
_____	_____
_____	_____
_____	_____

2. Based on existing educational programs and in view of the community employment picture, what suggestions can you offer to improve both areas? _____

_____

_____

3. Select one community occupation or subsistence job and elaborate on the following:

JOB TITLE _____

a. What competencies are needed by a worker?_____

_____

b. Would additional training provide greater opportunity?_____

_____

c. What kind of training?_____

d. What would be projected expansion needs?_____

e. What is the turnover rate of employees?_____

f. Are there opportunities for advancement?_____

g. What is the greatest disadvantage of this job?_____

_____

4. Of the youth who either complete their high school education or drop out, what is the employment outlook locally ?_____

a. What percentage remain in the community?_____

b. Of those who remain what kinds of jobs are available for them to select?_____

_____

c. Do you feel special training would give them greater employment opportunity locally?_____

d. If so, what kind of training?_____

Is this training available now?_____

5. At the present and for future implementation of Industrial Education courses, can you identify community persons who have some specialized expertise that could be tapped in the future as a para-professional, teacher aide,etc.? This should

include both occupational cluster occupations and subsistence jobs. 123

	SPECIALIZED SKILL	NAME OF INDIVIDUAL(S)
a.	_____	_____
b.	_____	_____
c.	_____	_____
d.	_____	_____

6. Can you identify need areas for adult training or education?_____

_____

Approximately how many persons could this include?_____

RURAL INDUSTRIAL EDUCATION PROJECT

REAA _____

SCHOOL _____

DATE 124

TEACHER INTERVIEW GUIDE

I. BACKGROUND INFORMATION

1. How long have you been teaching? _____

   in this school? _____

II. EXPECTATIONS AND GOALS

1. What do you see as the greatest needs of the children? _____

   _____

2. What do see as their greatest strengths? _____

   _____

3. Looking ahead, what do you hope to accomplish with the students in your class this year? _____

   _____

III. PARENT CONTACT AND EXPECTATIONS

1. Do you have much contact with the parents? _____

2. When you seem them?

often _____	informally _____	PTA meetings _____
sometimes _____	planned conferences _____	Advisory School Board _____
rarely _____	class meetings _____	workshops _____
	community meetings _____	

3. What are the parents' expectations for their children? _____

   _____

4. What have been your most effective contacts with parents? _____

   _____

5. What are the main problems, if any, as you seem them? _____

   _____

IV. DECISION-MAKING AND SUPPORT

1. How are the goals of the school established? _____

_____

BIA area office _____ School administration _____

Native corp. _____ Staff & administration _____

Advisory School Board _____ Parents _____

Community _____

2. Do you feel you as a teacher can make your voice heard in these decision-making processes? _____

3. Who is available in the school to help you with special needs? _____

_____

curriculum areas _____ special learning problems of individual children _____

work with parents _____

4. Do you have regularly scheduled staff meetings? _____

5. What kinds of things do you usually talk about? _____

_____

6. Is there an inservice training program within your school? _____

_____

7. If so, who plans this training? _____

What is it like? _____

Is it helpful? _____

8. Do you have any further ideas for things that the school could be doing?

_____

for children _____

for parents _____

for staff _____

for community _____

V. CURRICULUM

1. What are the things you take into consideration when you plan your curriculum? _____

_____

2. Which part of your curriculum is the most important in your view? _____

_____

3. Who chooses the materials you are using? _____

4. Are you satisfied with them? _____

5. If you wanted to change them, how would you go about it? _____

_____

6. Do you include native culture in your curriculum? _____

7. Can you give me an example? _____

8. What sources do you use? _____

environment _____ community people _____

books _____ other _____

VI. TEACHER'S ASSESSMENT AND EVALUATION OF STUDENTS

1. How do you assess the students' progress & development? _____

_____

classroom teacher evaluation _____ student's work _____

staff meetings _____ parent conferences _____

standarded tests _____ other methods _____

2. What do you find the most useful approach to evaluation? _____

_____

VII. TEACHER'S SATISFACTIONS/DISSATISFACTIONS

1. What would you say are the greatest satisfactions and dissatisfactions on this job? _____

_____

RURAL INDUSTRIAL EDUCATION PROJECT

REAA _____

SCHOOL _____

DATE _____ 127

INTERVIEW GUIDE FOR SCHOOL PRINCIPALS, DAY CARE, AND HEADSTART DIRECTORS

I. DECISION MAKING

1. In what ways do you think your school is functioning most effectively?

_____

Least effectively? _____

2. How are the goals of the school arrived at? _____

_____

3. What kinds of decisions does the Board make? _____

Staffing _____

What aspects of educational policy?

4. Are you satisfied with the way the Board functions? _____

5. Do you feel that you have sufficient autonomy in the running of your school? _____

6. Have advisory boards been established? _____ What kind? _____

_____

II. STAFF DEVELOPMENT

1. Do you have regularly scheduled staff meetings? _____

How often? _____

2. What do those meetings usually cover? _____

3. What kinds of inservice training are provided for the staff? _____

_____

4. If funding were available, what further training would you like to provide for your staff? _____

_____

III. STAFFING

1. Where do most of the teachers come from? _____

2. How are they recruited? _____

3. What about the aides? -- How are they recruited? _____

IV. PROGRAMS/CURRICULUM

1. Do you feel that the school/center is meeting the needs of the children and their parents? _____

_____

2. In what ways? _____

3. In your opinion, what programs should be offered that currently are not? _____

_____

4. Are supporting servicesoffered to children and/or families through the school? _____

Social services _____

Health _____

Dental _____

Psychological _____

5. Do you have Title monies? _____

(If yes, which?) _____

6. Who is responsible for writing proposals for these funds? _____

_____

7. Who is responsible for administering and accounting for these funds? _____

_____

8. Is the school building used as a community resource? _____

For community activities _____

adult education classes _____

During the year _____ or summer _____

9. Do you think the community would like to expand the use of the school for any or all of these activities if they are not currently provided? _____

_____

10. Do you think that the school could be further utilized to serve the needs of

the community? _____

11. In what ways? _____

_____

V. PARENT INVOLVEMENT

1. How do you inform parents of their children's progress? _____

_____

2. How do parents communicate to you what they want for their children? _____

_____

3. In your opinion, are the parents well informed about school programs for their children? _____

_____

4. In what other ways are parents involved in the life of the school? _____

_____

5. What would you like to see in the way of parent involvement? _____

_____

VI. PERSONAL

1. How long have you been here, in this job? _____

How did you come to be here? _____

What were you doing before you came? _____

2. Whom do you talk to when you have problems on the job? _____

_____

3. What are the greatest satisfactions/dissatisfactions of the job? _____

_____

RURAL INDUSTRIAL EDUCATION PROJECT

KIAA _____

SCHOOL _____

DATE 130

PARENT INTERVIEW GUIDE

I. PARENT-SCHOOL COMMUNICATION

1. Are the parents invited to visit the school? _____
2. Have you ever been to any of the meets at school? _____
3. How do you know when there is a meeting -- do you get notices? _____

   Are they written? _____

   Are they in English? _____
4. Do you belong to the Advisory Board or to any of the school committees?

   _____
5. Does the Advisory Board meet often? _____
6. What kinds of things does the Advisory Board do? _____

   _____
7. What do you think of it? _____
8. Does the principal pay attention to the Advisory Board? _____
9. What kinds of things does the school as the parents to do? _____

   _____

II. ATTITUDES TO SCHOOLS

1. What do you think of the school _____ (name) go(es) to? _____
2. Have you had a chance to see the children's teachers? _____
3. Does _____ (name) have a white teacher or a native teacher? _____

   _____
4. What is the greatest need for schools to perform in your opinion? _____

   _____

III. LANGUAGE

1. What language(s) do you speak at home? 155 _____

III. LANGUAGE cont'd

among children _____

among adults _____

child-adult _____

* (If Native American language is dominant in home):

2. When _____ (name) went to school how did that work out? _____

3. How does the school deal with this? _____

Is teaching in English? _____ Native languge? _____

Both? _____

** (If Native American language NOT dominant in the home):

4. Do you think it is important for your children to learn the _____ language? _____

5. Do you think it should be used by the teachers in the school? _____

IV. OWN EDUCATIONAL EXPERIENCE, ASPIRATIONS FOR CHILD(REN) AND GENERAL VIEW OF EDUCATION

1. Did you grow up in this area?_____

2. (If yes) Was the _____ school here then? _____

Did you go? _____

3. (If no) What kind of school did you go to? _____

4. Have things (i.e., school) changed much, do you think? _____

_____

5. Do you want your children to go on to high school? _____

If so, where? _____

6. Have they said anything about this? _____

7. What kind of work would you like to see them get? _____

_____

8. Have they said anything about what they want to do? _____

V. ELDERLY

1. Do you like your life? _____
2. What would you like to add? _____
3. Is your role changing? _____
4. Do you have an advisory role in education? _____
5. How do you feel about getting involved with young children? _____

_____

RURAL INDUSTRIAL EDUCATION PROJECT

TRIBAL OFFICIALS INTERVIEW GUIDE

RUN _____

SCHOOL _____

DATE 133

I. ATTITUDES AND OPINIONS ABOUT THE SCHOOL SYSTEM

1. What do you think of the school system that the children and young people here go to? _____

   early education _____

   elementary _____

   high school _____

2. How much of a voice does this community have in the way the school(s) is (are) run? _____

   _____

3. How are the School Board members chosen? _____

4. What kinds of decisions does the School Board make? _____

   _____

5. About your high school, do you feel good about the kind of education the students are getting? _____

6. Are the young people (e.g., adolescents) getting the kind of education they will need to help them get jobs later on? _____

   _____

7. Do some of the young people leave school before graduating? _____

8. If so, what do you think about this? _____

   _____ Why do they leave? _____

   _____

II. LANGUAGE AND TRADITIONS

1. Do most of the adults in the community speak the (native) language? _____

   What about the children? _____

2. Do you think the native language should be taught in school? _____

   If yes, who do you think should teach it? _____

3. Do you think the traditions and the history of the people of the community

should be taught in school? _____

If yes, who should do it? _____

4. Is there anything that you think it might be especially important for us to know about this community? _____

_____

_____

A-14

Teacher Competency Pretest 135

for

Rural Industrial Education Outreach

Professional Observation Rater's Scale: Proficient (1) Adequate (2) Needs Training (3)

	Item (circle one response for each item)	Rating
1.	Obtain technical knowledge in the operation of the program modules	3 2 1
2.	Set up learning stations	3 2 1
3.	Promote the program to parents and the community in general	3 2 1
4.	Improvise and solve problems related to materials, equipment and other procedures.	3 2 1
5.	Assess and identify community resources which can supplement the program modules	3 2 1
6.	Devise ways in which the program modules can be utilized by adults as well as students	3 2 1
7.	Conduct needs assessments in the community	3 2 1
8.	Utilize pre and post test instruments	3 2 1
9.	Maintain effective record keeping procedures	3 2 1
10.	Maintain inventory control on all materials and supplies	3 2 1
11.	Forecast future module requirements	3 2 1
12.	Provide guidance in instruction	3 2 1
13.	Obtain both an historical and future orientation with respect to rural industrial education in Alaska	3 2 1
14.	Establish rotation schedule for use by students of learning modules	3 2 1
15.	Re-package modules for re-distribution to other sites	3 2 1
16.	Evaluate effectiveness of learning modules	3 2 1
17.	Encourage desirable work habits on part of students	3 2 1
18.	Locate proper physical space for learning stations	3 2 1
19.	Maintain good communication with district administrator and outreach center	3 2 1
20.	Locate sufficient storage space of modules	3 2 1
21.	Develop proper safety precautions for use of materials	3 2 1

A-15

Local Administrator Competency Pretest

for

Rural Industrial Education Outreach

Professional Observation Rater's Scale: Proficient (1) Adequate (2) Needs Training (3

	Item (circle one response for each item)	Rating
1.	Knowledge of vocational education philosophy	3 2 1
2.	Knowledge of Rural Industrial Educational Outreach Program	3 2 1
3.	Assess program needs and conduct community surveys.	3 2 1
4.	Catalog incoming training modules and distribut on rotation schedule	3 2 1
5.	Solve local problems associated with implementation of the program	3 2 1
6.	Undertake planning with respect to storage and future facility needs	3 2 1
7.	Coordinate vocational education curriculum intradistrict level	3 2 1
8.	Share information on program within the community and among school staff	3 2 1
9.	Utilize available resources in the implementation of the program	3 2 1
10.	Write proposals for funding	3 2 1
11.	Arrange for students to attend other vocational education programs	3 2 1
12.	Represent the program to the local school cummunity committee and board	3 2 1
13.	Undertake local program evaluation	3 2 1
14.	Evaluate teacher effectiveness in utilizing programmed modules	3 2 1
15.	Interview teachers regarding vocational needs related to the programmed modules	3 2 1
16.	Design procedures for dealing with vandalism, etc.	3 2 1
17.	Maintain good communication with teachers, students, parents and the community at large	3 2 1
18.	Determine the articulation of the program to graduation requirements	3 2 1
19.	Assess the materials to be used by adult populations in the community and the related procedures necessary.	3 2 1